

CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society
Of America

Vol. XXVI

MAR-APR., 1954

No. 2

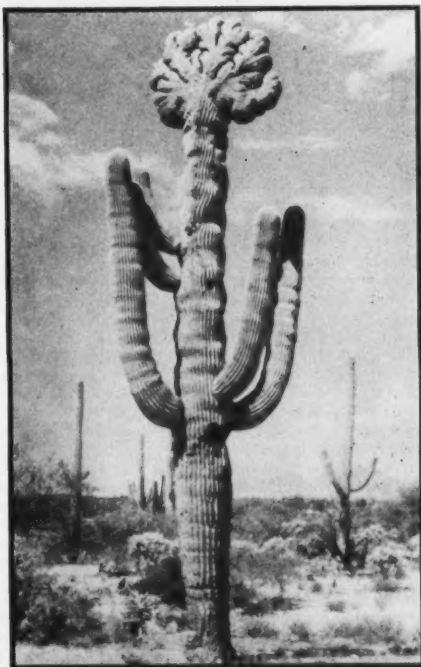


FIG. 27. Crested Saguaro on Frank Mark's ranch
in Arizona.



CACTUS AND SUCCULENT JOURNAL

Published and owned by the Cactus and Succulent Society of America, Inc., 132 W. Union St., Pasadena, Calif. A magazine to promote the Society and devoted to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. North and South America \$3.00 per year; foreign \$3.50 by money order. Mail application to SCOTT HASELTON, Editor, 132 West Union Street, Pasadena 1, California. Editorial Staff: THE ENTIRE SOCIETY. Entered as Second Class Matter at Pasadena, Calif., under act of March 3, 1879. Published bi-monthly. We reserve the right to accept or reject advertising or articles sent to this JOURNAL.

Vol. XXVI

MARCH-APRIL, 1954 (Price 50c)

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COMING EVENTS

During 1954 the Cactus and Succulent Society of America hopes to present and conduct several events which should prove entertaining and interesting to all persons who are interested in succulent plants.

The first of these events is a garden tour to the justly famous Huntington Botanical Gardens, San Marino, Calif., to be held on Sunday afternoon, March 28th, 1954, at 1:00 p.m. All those interested in making this tour will meet near the entrance to the Gardens at 1:00 p.m. and the trip will be made in groups. If you wish to make the tour please send a post card to Jack Whitehead, 424 W. 69th St., Los Angeles, and let him know how many will be in your party so that tickets may be secured for you; these tickets will be available at the gate when you arrive. This seventeen acre cactus garden is probably the largest and most complete collection of succulent plants which can be seen at one time, in the whole country and is well worth the time and effort required to make the trip to visit it. Do not forget to write to Mr. Whitehead for tickets as otherwise there will be none for you.

Another event which the Committee is now planning is an over-night, week-end trip to Joshua Tree National Monument, near Twenty-Nine Palms. If you are interested in this trip write to Edward S. Taylor, 3036 Nebraska Ave., South Gate, Calif., for further information. The date of this field trip is tentatively set for May 1st and 2nd, 1954. This trip is not a hard one as the Monument is located only about one hundred and fifty miles from Los Angeles, all over excellent roads. The Monument has many fine camping sites with the necessary conveniences and for those who wish to stay in motels it is only 12 miles from the heart of the Monument to Twenty-Nine Palms and about the same to Joshua Tree. Good restaurants are to be found in both towns. Information on this trip will be sent to those who write to Mr. Taylor asking for it, so if you wish to see the desert in flower and mingle with others interested in the desert and just generally have a fine time, write now for the information.

The Committee is planning other events but the plans are not far enough along to say much about them but later all the information will be given.

GENE LUCKENBACHER, *Publicity Director*

FROM THE EDITOR

The January-February issue of the Cactus and Succulent Journal is evidently the kind of a magazine that appeals to the majority of our readers. The many letters received like the idea of a Plant of the Month and pictures of cacti and succulents that are available in the trade. Now that we know the type of a magazine that is most popular we will endeavor to comply with your wishes as fast as can assemble this type of material. The eight Board Members who have promised popular articles are setting the example for the other members who should take part in our plan for 1954.

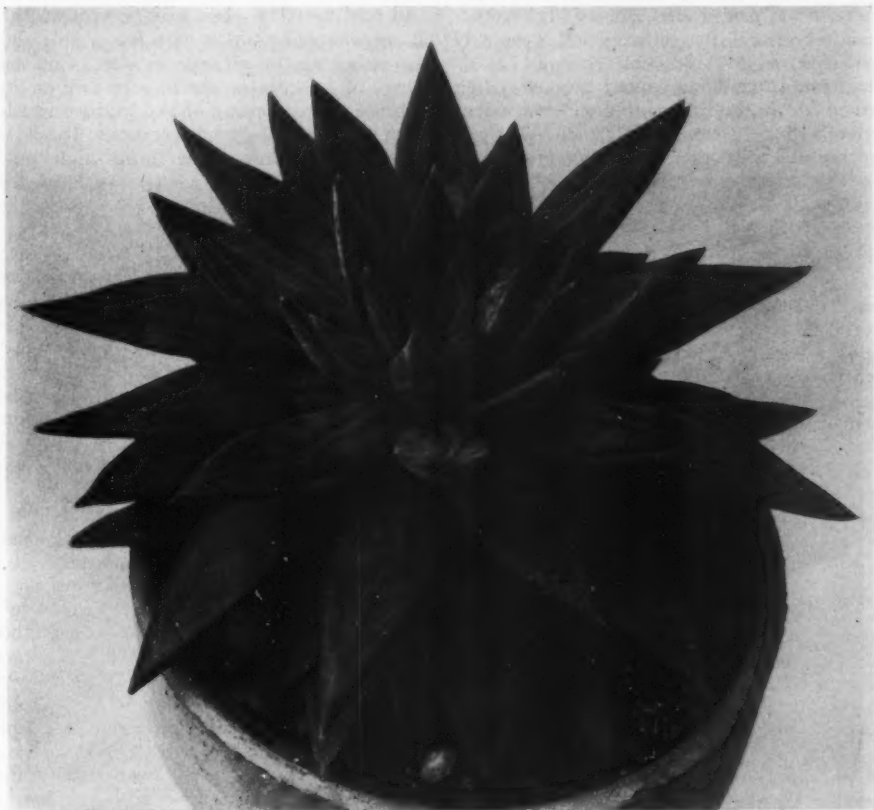
Regarding the notes about *Lophophora williamsii* in the last issue we would like to clarify the situation. Mr. Fitzpatrick's letter tells the story:

"Several of our customers have written to know if we had been arrested for selling *Lophophora williamsii*. Mr. Jesse Thomson was at our place the past Sunday, Feb. 7th, 1954—and informed me that he had written to you about the situation. He also stated to me that no cactus dealer had been arrested, but one poor Mexican collector who supplied Mr. Thomson had been arrested. Mr. Thomson said the Mexican was selling 30,000 to 40,000 plants per year to the Indians. This, of course, was the cause of all of the trouble. I'm sure that none of the older cactus dealers in Texas would sell peyotes to the Indians. I'm also sure that the Texas law is unconstitutional for this plant is a part of the Indian religion and the Federal Constitution protects every American's religious belief. Mr. Thomson, also informed me that Mr. Naylor, did not confiscate the plants he had on hand, but informed him to dispose of them and not to collect any more.

"We don't like for the general public to be stirred up over this situation, and certainly do not like for aspersion to be cast against every legitimate and honorable dealer in Texas. The writer has refused to sell *Lophophora williamsii* to other than legitimate collectors and dealers for about twenty years."

QUESTIONS AND ANSWERS

Be sure to send your questions to Harry Johnson, Paramount, California, and he will be glad to continue his regular column.

FIG. 28. *Echeveria craigiana* Walth.

Echeverias for the Fancier

(A talk by H. M. Butterfield with many specimens, given before the California Cactus and Succulent Society, Oakland, Calif., Nov. 8, 1953.)

The Genus, *Echeveria*. The family of plants known to botanists as Crassulaceae includes a very large number of succulent species, perhaps over 900 species and about 25 genera. The botanist makes a distinction on floral characteristics when listing the genera. First he considers the number of stamens in relation to the number of petals in the flower and whether or not the leaves are opposite. If the stamens are the same number as the petals, and leaves are opposite, then the plant probably falls into either *Crassula* or *Rocbea*, or a closely related group. If the stamens are twice the number of petals, or the same number, and the leaves are not opposite, then the plant will fall into one of several other genera, such as *Sedum*, *Sempervivum*, *Aeonium*, *Kalanchoe*, *Cotyledon*, *Grapt-*

petalum, *Echeveria*, *Dudleya*, or *Pachyphytum*. For the present we will confine ourselves to a single important genus, *Echeveria*, with petals only half as many as the stamens, leaves not opposite, corolla usually gamopetalous (in one piece), lobes of corolla 5, inflorescence lateral and floral stems arising in the axils of the leaves; corolla lobes thick and fleshy, spreading only at the tips, and not banded or spotted; petals without appendages; and flowers usually nodding rather than upright as in *Dudleya*. Flowers may range from pink to almost red in *Echeveria* whereas in *Dudleya* the flowers are usually cream to white. Certain taxonomists, such as Eric Walther of Golden Gate Park, and Dr. Reid Moran, have studied these two genera in great detail and are considered authorities. The speaker will not dwell on the botanical side but rather on horticultural phases of the subject. He would like to point out, however, that

Echeveria was named after Atanasia Echeverria, Mexican botanical draughtsman, and is properly pronounced ěk-ě-vě'-rĭ-ă, not ěch-ě-vě'-rĭ-ă, although the latter Americanized pronunciation is common. In the following discussion, no attention will be given to *Cotyledon*, *Dudleya*, *Sinocrassula*, and other succulents often confused with *Echeveria*. *Echeveria* will include succulents sometimes listed as *Urbinia*. *Graptopetalum* will not be included.

Where to Learn More. There are few references that will help the beginner very much in identifying the various species of *Echeveria*, in fact many publications are so badly confused that they are almost worthless in studying this genus. Some of the best California nursery catalogs that list these plants are more helpful to the beginner. Only a few nurseries handling succulents specialize in *Echeverias* and horticultural forms or hybrids. A beginner can often learn more about the species and cultivars by attending a meeting of succulent fanciers, or by looking over collections, than in any other way. Some of the species and forms are scarce and rare. Several are only newly introduced and not yet offered for sale at ordinary dealers. Excellent new hybrids, such as some on display today, may take several years to propagate and distribute but will doubtless become available in time. Many of us have hoped that Eric Walther could publish his monograph on this genus with pictures to help fix names and center our attention on closely related groups. The collection located at the Botanical Garden of the University of California in Berkeley is well named and includes a good many of the newer species but as yet, not many of the cultivars of recent breeding. Plans are now under way to propagate many of the finest cultivars, however. Visitors are welcome at the Botanical Garden during the day.

Home of the Echeveria. Most species are native of Mexico but the range includes the lower United States and even South America. Species have been hybridized and selected for varieties until at present we have many forms of interest to the fancier. Some of these have been grown in California for well over 50 years by such early growers as Theodora B. Shepherd of Ventura, Germain Seed and Plant Co. of Los Angeles, and others. The work of Britton and Rose and others called attention to botanical differences but the fancier knows that living plants are the best source of material for identification so the grower will have an important place in further studies, regardless of the original home of species or varieties.

Some Contrasts. The fancier is attracted because of the great variation in species, hybrids,

and cultivars. The plant may be very small, as *E. amoena* (*E. pusilla*) with leaves only about $\frac{3}{4}$ inch long, or gigantic in size as in some forms of *E. gigantea* and *E. gibbiflora* or their hybrids where a spread of two to three feet has been seen in well-grown specimens. The flower stems may be only a few inches high, up to perhaps not more than 8 inches in *E. amoena*, or up to three feet or more in *E. gigantea* and its hybrids.

The foliage may be pubescent as in *E. leuco-tricha*, *E. pilosa*, *E. pubescens*, *E. pulvinata*, and *E. setosa*, or in such hybrids as 'Doris Taylor,' 'Pulvi-Carn,' 'Pulv-Oliver,' and 'Set-Oliver.' But the leaves are more often glabrous (not hairy). Many species have glaucous leaves, though not as pronounced as in some *Dudleyas*. The leaves may be green, pale green, or highly colored with red and sometimes the leaves have a red margin or rim, as in some forms of *E. gigantea*. Growers have selected for leaves with a crenulate or undulate margin, and sometimes with a tooth or cusp, as in *E. runyoni*. Occasionally the foliage may be streaked with color, as in *E. boveyi* and *E. nodulosa*. Some species are stemless or nearly so while many of the popular sorts form a stem slowly with age, but others are always stemmy, as *E. pulvinata* and *E. leuco-tricha* in the hairy group and *E. alata*, *E. montana*, *E. gibbiflora*, *E. harmsii* and *E. spectabilis* among those with glabrous foliage. Some offset very freely and even propagate from leaves that drop, such as *E. amoena*, while others offset only slowly and in age, as *E. longissima*, *E. corderoyi*, *E. agavoides*, *E. purpusorum* and such cultivars as 'Edna Spencer' originated by the author. When offsets do form on these they usually form in only small numbers unless the top of the plant is cut back or injured in some way. Leaves may be very large and broad, as in *E. gigantea*, or very narrow and pointed, as in *E. craigiana*. Growers may select forms with some peculiarity as *E. gibbiflora* var. *metallica* 'Carunculata' and 'Edna Spencer' with distinct warts or callosities on the older leaves. *E. pubescens* var. *recurvata* has the leaves curled back in peculiar fashion. Thus it will be seen that there is extreme variation in habit within the genus and often wide variation within a species. The breeder is never sure what he will get by hybridizing. Some characters are dominant and others are latent, such as hairiness. A new form, such as 'Edna Spencer' may have seed that is almost entirely sterile, yet there is a possibility of getting a few plants out of a large number of seeds. Here is a challenge to the fancier. Fortunately seedlings usually become mature in two or three years in spite of the fact that the seedlings are extremely small when they first appear. Some

kinds are easy to grow and others are most difficult to keep alive. Perhaps local conditions will play an important part in deciding whether or not a so-called "difficult" species can be grown. The writer has some trouble in growing *E. longissima* but gets along well with *E. pur-*

pusorum, especially from seed.

Frost and rainy weather are common enemies of the more tender kinds of Echeverias. Some like *E. elegans* apparently like a lime soil while others seem to do best in a soil mixture containing acid leaf mold. Most of the popular kinds



FIG. 29. *Echeveria derenbergii* is one of our most attractive Mexican succulents. The pale green leaves are marked with red on the upper margins. Its low compact flower stems have many orange-yellow flowers over a long period. Photo from J. R. Brown's new book of 110 best photographs of Succulents—see Advertisement.

are not particular as to soil. So each grower will need to study his conditions and select accordingly. *E. hoveyi* does well with partial shade. *E. elegans*, *E. agavoides*, *E. pulvinata*, and *E. setosa* will stand considerable frost. The *E. gibbiflora* group will usually be killed back by severe frost. The kinds with large cupped leaves, such as forms of *E. gigantea* and the cultivar known as 'Hoffmani' soon start to rot or develop leaf spots when the leaves remain cold and wet in winter. The same plants would probably get along better if the foliage could be kept dry in some way. No doubt aeration would

help. The best color comes with only a moderate supply of soil moisture and a fairly warm sun. Many kinds of Echeverias are at their best from August through September in California gardens and start to decline by November and December. New growth starts again after the coldest weather is over in April. Even in the greenhouse we can usually anticipate the best exhibition form in August and September if the plant is a tender one, but the more hardy kinds, such as *E. agavoides* may remain presentable for almost every month in the year.

Partial List of Echeveria Species—Some of the species found in local collections are listed below. No attempt has been made to list all of the species grown or give full descriptions.

SPECIES

REMARKS

<i>Echeveria agavoides</i>	Short stems, densely imbricated; leaves spine-tipped, to 3 inches, pale green but sometimes darkened toward tips; hardy.
<i>alba</i>	One ft. stems; leaves raddish at edges.
<i>alpina</i>	Stemless; truncate leaves, glaucous, to 3 inches.
<i>amoena (pusilla)</i>	Nearly stemless, very small rosette to about 1½ inches; offsets freely.
<i>bella</i>	Rosettes small like some Sedums.
<i>bifida</i>	Slender leaves in low rosettes.
<i>carminea</i>	Leaves with slightly red margins; stems to 8 inches.
<i>carnicolor</i>	Small, dense rosettes 3-4 inches in diameter, glaucous and pinkish; flowers bright red on stems to 6 inches; stands some shade.
<i>chiclensis</i>	Slender, pointed leaves, pulverulent, closely resembling some Dudleyas; 5-6 inches across.
<i>coccinea</i>	Gray-pubescent; leaves oblanceolate to 4 inches; flowers red.
<i>corderoi</i>	Similar to agavoides, to 6 inches in diameter; often listed under <i>Urbinia</i> .
<i>craigiana</i>	One of the fine newer species with pointed linear leaves and pinkish color; to 6 inches or more in diameter.
<i>crenulata (rosea-grandis)</i>	Very large leaves to 1 ft. long and 6 inches wide, wavy red margins. A crested form grown occasionally. Stems to 1 ft. in age; tender. Several hybrids grown. Best color in full sun. One of the best.
<i>cuspidata</i>	Stemless, dense rosettes to 5 inches; leaves glaucous, tinged red. Flower stems to 8 inches. Name from cusp at tip of leaf.
<i>derenbergii</i>	Small rosettes to 3 inches, grayish-white with red leaf margins and sharp tip. Popular for its small size.
<i>elegans</i>	Stemless, rosettes 3-4 inches; glaucous leaves and pink flower stems which come early (April-May). Common in borders and on walls; hardy.
<i>expatriata</i>	Dense rosettes to about 2 inches in diameter. Flowers pinkish.
<i>fulgens</i>	Rosettes to 6 inches or more, often with red at the margins; stems short. Perhaps some of the smaller plants offered under this name are hybrids, one of which has pleasing crenulated edges.
<i>gibbiflora (grandifolia)</i>	Vigorous plant with large leaves to 7 inches long, usually with pink shadings. Flowers red. Several forms offered and grown. Leaf stems vigorous and leafy and easy to root; tender.
var. <i>metallica</i>	Leaves with a decided metallic pink color. 'Carungulata' is a form with caruncles on the larger leaves. 'Flammea' and 'Orpet's Chocolate' probably belong in this species. All are tender.
<i>gigantea</i>	Very large, becoming a shrub; leaves to 10 inches long and 6 inches wide; some with red margins; flowers reddish on stems to 3 ft. 'Crispata' with crenulated leaf margin has been offered. Many new selections with high color and crenulated leaves are now being tested and some are being named.
<i>glauca</i>	Leaves nearly orbicular, pale, glaucous, with purple point. Rosettes are small; flower stems reddish.
<i>harmisii (Oliveranthus elegans)</i>	A fine plant under any name, with large flowers to 1 inch long at the end of branches, plant much-branched, to 20 inches; hardy.
<i>humilis</i>	Stiff, pointed leaves, resembling some Pachyphytums.
<i>hoveyi</i>	Long spatulate leaves streaked with yellow; rosettes up to 6 inches across; stems 4-6 inches in age. Does best in partial shade and usually grown as a pot plant.
<i>leucotricha</i>	One of the hairy species, much-branched, to 15 inches in height; flowers cinnabar red.
<i>linguaefolia</i>	Thick, greenish leaves, nearly cylindrical at the base; flower stems long and spreading. A yellowish-green hybrid. 'Multicaulis' sometimes mistakenly listed as this species.

SPECIES

REMARKS

Echeveria

<i>longissima</i>	Excellent, compact rosette, stemless; leaves with a point. Considered somewhat difficult to grow.
<i>lozani</i>	Nearly stemless and with dense rosettes; leaves lanceolate to 4 inches long, center copper-colored; flower stems to 18 inches.
<i>montana</i>	Plant with stem to 1 ft., rosette small and dense to 4 inches wide; flower stems to 1 ft.
<i>multicaulis</i>	Stems to 3 ft.; leaves to 8 inches long and 3 inches wide with ruddy tip; flowers reddish; stems sometimes creeping like some Sedums.
<i>nodulosa</i>	Stems 1 to 2 ft., crowned with small dense rosette, to 4 inches; leaves greenish with purplish red margins. Flowers yellow tinged red.
<i>nuda</i>	Leaves to 2 inches, slightly glaucous, seated toward apex with 4-inch stems.
<i>palmeri</i> (rosei)	Stemless, rosettes to 16 inches or more and rhomboid leaves to 4 inches wide, margins reddish.
<i>peacockii</i> (desmetiana)	Stemless, small rosettes to 4-5 inches wide, white-glaucous, reddish toward top; flowers bright red on stems to 1 ft. Fine pot plant.
<i>potosina</i>	Somewhat resembles <i>elegans</i> .
<i>pringlei</i>	Creeping stems to 1 ft.; leaves pubescent, oblanceolate to 4 inches long; flowers scarlet.
<i>pubescens</i>	Stems to 2 ft., velvety-pubescent; leaves obovate and spatulate to 3 inches long. Flowers bright red.
var. <i>recurvata</i>	Has recurved leaves.
<i>pulvinata</i>	Velvety-pubescent stems and leaves; rosettes to 3 inches and leaves have reddish margins and tips; hardy.
<i>pumila</i>	Stemless, stoloniferous, with small dense rosettes to 3 inches; leaves 1/2 inch wide, glaucous.
<i>purpusorum</i> (<i>Urbinia purpusorum</i>)	Compact rosettes with broad, pointed leaves, gray-green mottled brown; forms stems with age, up to 4 inches.
<i>rosea</i>	Thin, slender leaves to 3 inches, edges tinged red; stem to 6 inches or more; flowers on leafy branches.
<i>rubromarginata</i>	Stemless or nearly so; leaves oblanceolate to 5 inches long, glaucous with light red wavy margins. Flower stems to 4 ft.
<i>runyoni</i>	Almost stemless; leaves nearly white, spatulate, cuneate, to 3 inches; slow-growing.
var. <i>macnabeana</i>	Similar but larger.
<i>scheeri</i>	Stems to 8 inches or more, caulescent; rosettes 3-4 inches wide, slightly glaucous.
<i>setosa</i>	Stemless, leaves very hairy or bristle-like in a 4-inch rosette. Plant offsets freely; flowers with red tips. Plant is hardy and suitable for borders.
<i>secunda</i>	Leaves obovate, with short point, glaucous, reddish at margins; rosette small; flower stems to 15 inches.
<i>simulans</i>	Resembles <i>elegans</i> but has a flatter rosette.
<i>spectabilis</i>	Large, ruddy leaves, slightly blotched with red; rosette to 1 ft. or more
<i>strictiflora</i>	Stemless, somewhat resembling a small Dudleya.
<i>subrigida</i> var. <i>palmeri</i>	Large, ruddy leaves, slightly blotched with red; rosette to 1 ft. or more across.
<i>walpoleana</i>	Thin pointed leaves, nearly stemless, dense, somewhat resembling <i>E. agavoides</i> ; flower stems to 1 ft.

ECHEVERIA HYBRIDS

'Bradburyana'	Named after a former succulent grower, E. P. Bradbury, at Fontana, Calif. Makes a hardy border plant with small rosettes on short stems.
'Clavata'	(<i>Pachyphytum bracteosum</i> x <i>Echeveria</i>)
Now called <i>Pachyveria clavata</i>	
'Doris Taylor'	(<i>Echeveria setosa</i> x <i>Echeveria</i> ?)
'Gilva'	(Said to be a hybrid of <i>E. simulans</i>)
'Imbricata'	(<i>E. glauca</i> x <i>E. gibbiflora</i> var. <i>metallica</i>) The commonest "hen-and-chicken in gardens.
'La Rochette'	Developed by Victor Reiter, Jr., San Francisco
'Mirabilis'	(<i>E. languefolia</i> x <i>E. scheeri</i>)
'Orpetii'	(<i>Pachyphytum bracteosum</i> x <i>Echeveria</i>)
Now called <i>Pachyveria orpetii</i>	
'Pulvi-Carn'	(An <i>E. pulvinata</i> cross)
'Scanavino'	Named by Eric Walther
'Scaphylla'	(<i>E. agavoides</i> x <i>E. longuaefolia</i>)
'Scheideckeri'	(<i>Pachyphytum bracteosum</i> x <i>E. secunda</i>)
Now called <i>Pachyveria scheideckeri</i>	
'Set-Oliver'	(<i>E. setosa</i> x <i>E. barmisii</i>)
'Sobrina'	(<i>Pachyphytum hookeri</i> x <i>Echeveria</i>)
'Weingartii'	A listed hybrid

(Note: the above have been listed as cultivars. No doubt some variation will be found among seedlings of the same cross so it seems best to apply a cultivar-name to the hybrids introduced.



FIG. 30. *Echeveria elegans* forms clusters which are called "Hen and Chickens."



FIG. 31. 'Doris Taylor' an *Echeveria setosa* hybrid is one of the best.

On Buxbaum's Phylogeny of the "Euechinocactineae"

By REID MORAN

Dr. Franz Buxbaum of Judenburg, Austria, has presented (2-6) a new classification of a large segment of the cactus family, based on comparative morphology, especially of the seeds. The group treated includes the Coryphanthaceae and most North American members of the Echinocactaceae in the system of Britton and Rose. With this new classification, according to Buxbaum (4), a truly phylogenetic system is finally achieved, and the cactus fancier may now name his plants without fear of further name changes. The most notable result nomenclaturally is the division of *Mammillaria* (*Neomammillaria* of Britton and Rose) into two large genera and four small ones.

Buxbaum's main thesis is that in the "Euechinocactineae" certain groups that have been called genera are polyphyletic, consisting of the corresponding stages on parallel lines of descent. Vertically, his phylogenetic chart (2, 4, 5) shows four major lines of descent—four since one of his three rami is divided from the base. Horizontally, it shows five evolutionary stages passed through by members of all four lines. In the ultimate stage, the *Mammillaria* stage, the stem is small and tubercled and the areoles are dimorphic: each tubercle bears a sterile usually spiniferous terminal areole and a floriferous, often spineless axillary areole. According to his view, members of the old genus *Mammillaria* belong to three of these main lines of descent, as well as to several sublimes, and hence cannot possibly all be included in one genus.

Although Buxbaum has used all available morphological information, the characters which he considers most conservative and most indicative of relationship are found in the seeds. Since most authors have given too little attention to seed characters, it is time for a thorough systematic investigation of the seeds to be integrated with the other available information. Buxbaum has integrated his data well, and his system is in some ways a great advance over anything published before.

Buxbaum takes a rather liberal viewpoint on genera. Aside from the four genera proposed by Backeberg in this group, there are few that he fails to recognize. (Material of *Navajoa* Croizat was not available, and he overlooked *Bisnaga* Orcutt, *Chilila* Orcutt, and *Escobesseyia* Hester.) Though this is purely a matter of opinion and Buxbaum is free to follow his own concepts, others may favor fewer genera. The subdivision of *Mammillaria* and the resulting name changes may at first glance seem undesirable, especially

since the segregate genera are not always easily distinguishable and some species cannot yet be referred to the proper genus for want of information about the seeds. Anyone wishing to take a more conservative stand may in a few instances combine genera without doing violence to the phylogenetic scheme. For example, although Buxbaum states (5) that *Rapicactus* "must" be kept separate from *Neolloydia*, its position on the chart indicates that they may be combined. Likewise, even if his views of relationships are accepted, such genera as *Porfiria*, *Bartschella*, and *Pbellosperma* may be combined with *Ebnarella* (properly *Chilila* Orcutt), *Obregonia* with *Leuchtenbergia*, *Pseudomammillaria* with *Dolichobothra*, and *Turbinocarpus* with *Toumeyia*. However, the ultimate members of the three separate lines cannot be included in one genus unless it includes all members of the three lines, i.e. the whole tribe. Aside from a few such cases, therefore, no one can quarrel with Buxbaum's generic segregations without disagreeing with his theories of relationships.

It is therefore necessary to consider Buxbaum's data and to weigh the evidence for and against his hypothesis. The validity of his conclusions is limited by the accuracy of his observations and the correctness of his identifications of materials. The reviewer has had little opportunity to check these data. The possibility of errors cannot be dismissed; for example, as mentioned below, Mr. Shurly has turned up what appears to be a serious error resulting from misidentification of seeds. Although Buxbaum's conclusions can be evaluated on the assumption that the data are accurate, various critical points must therefore be checked before any of these conclusions are finally accepted.

The greatest apparent obstacle to Buxbaum's hypothesis is the remarkable degree of parallel evolution that it requires. Much of his argument sounds quite convincing. That there has been much parallel evolution in the family seems beyond question, witness the similarity of the reduced flowers of such widely separated genera as *Cactus*, *Lophocereus*, *Lophophora*, *Mammillaria*, and *Rhipsalis*. Concerning the general course of evolution from the *Echinocactus* type to the *Mammillaria* type (as also suggested by earlier writers), his case is strong and may be accepted with few reservations. It is evidently true that mammillate forms have arisen independently in different parts of the family, and it appears that in this tribe there is a strong tendency for the flowering point to migrate from

the apex of the tubercle toward the axil of the tubercle. In the light of morphological studies by Boke (1), it may be questioned whether (as is usually assumed) the *Mammillaria* type of structure, with complete separation of spiniferous and floriferous areoles, has arisen from the *Coryphantha* type of structure, in which the flowers are borne at the axillary end of an elongate monomorphic areole. Perhaps, however, the *Mammillaria* type has arisen in this way and more than once, as Buxbaum believes. It may be that this has occurred independently in eight different lines of development, accompanied in each line by a shift of the flowers from sub-apical to lateral position and by parallel reduction of flowers, fruit, and seeds. It may even be that axillary spines ("bristles") have developed independently in some ultimate members of each of the three main lines despite their seeming absence from the flowering part of the areole at the *Coryphantha* stage, and that milky sap and dimorphic fruits (the latter apparently unknown elsewhere in the Angiosperms) have developed independently in two of these lines. This would be parallel evolution in the extremes, but no one can flatly say that it is impossible. Since, however, such extreme parallelism does not seem highly probable, the evidence must be scrutinized to make sure it permits no other interpretation.

What then are the seed characters by which the three rami are separated? In Ramus I, the testa is dark and tuberculate or secondarily smooth, the outer cell walls being thickened. In Ramus II, the testa is dark and usually more or less pitted, the radial cell walls being thickened, the outer walls thin and often somewhat bowed in towards the cell cavity. In Ramus III, the testa is light brown and all the cell walls remain thin and weak. Other seed characters show various progressions, sometimes more or less parallel within the three rami; but apparently there are no other thoroughgoing differences between the rami.

Buxbaum considers these rami absolutely distinct from the base, and he states that transitions from one type of testa to another are impossible. This statement is not further explained. The soft brown testa of Ramus III is said to be similar to that in the immature seeds of other cacti. If Ramus III is derived from *Echinocactus*, in which the testa is hard and black, then the soft brown testa must have arisen at some time by the retention to maturity of the normally immature condition. Why then is it impossible for this type of testa to have arisen within Ramus II? Perhaps he meant to say that Ramus III could not possibly be derived from Ramus II. This, of course, is another matter, since characters other than the testa type are involved,

even if there are no other thoroughgoing differences between the two rami. In any case, Buxbaum's statement as it stands seems open to question.

The phylogenetic chart (2, 4, 5) shows a line leading from *Echinocactus* through *Sclerocactus*, *Toumeyia*, *Leuchtenbergia*, *Obregonia*, and *Encelbalocarpus* to *Ariocarpus*. At first glance, this chart seems to imply that *Ariocarpus* is derived from *Echinocactus* as it exists today. A chart in the principal paper (3) makes it appear that such a literal interpretation is unfair to the author. Although it is less cumbersome to think and speak in terms of the other chart (2, 4, 5), Buxbaum sometimes seems to forget that *Echinocactus* (for example) may not now be identical with the ancestral genus but may itself have evolved since the origin of the line leading to *Ariocarpus*.

Supposedly in all members of Ramus II, the floral scales, when present, are naked in their axils; this is true even in the most primitive genus, *Ferocactus*, which is the connecting link from *Echinocactus*. Although *Coryphantha*, the primitive genus of Ramus III is in most respects more advanced than *Ferocactus*, two species have scales with axillary hairs. Buxbaum therefore concludes that Rami II and III must have developed from *Echinocactus* independently. In this conclusion he seems to assume that present-day *Ferocactus* is on the direct line of descent of Ramus II. Is it not possible that *Ferocactus* instead is on a short side branch and that its common ancestor with the *Neobesseyia* line still had hairs in the scale axils? In that case, *Coryphantha* could have branched off from the main line above where *Ferocactus* branched off. With such a phylogeny, the combination of *Escobaria* and *Neobesseyia* with *Coryphantha* would be reasonable and consistent with the facts, even though it would not necessarily follow or be desirable. In other words, this consolidation of genera would be optional and could not be entirely ruled out because of resulting in a bi-phyletic genus.

Some reason has been given to question the distinctness of Rami II and III. The distinctness of Ramus I is perhaps more likely. The *Strombo-cactus* line of Ramus I certainly seems distinct from Rami II and III—indeed no botanist in the last 75 years has united such plants as *Epithelantha* and *Ariocarpus* with *Mammillaria*—and the suggested phylogeny seems plausible. As to the *Thelocactus* line, the evidence is not so clear. Buxbaum makes what seems a good case for the relationship of *Mammilloidya* to *Neolloydia*, but his data are now seriously questioned by Mr. E. Shurly, the *Mammillaria* specialist. Mr. Shurly states in a letter that the seeds from which Buxbaum derived the generic

characters of *Mammilloidia* must have been misidentified and that Buxbaum's figure of the seeds of *M. candida* is entirely incorrect. The fact remains, however, that some members of the old *Mammillaria* are always described as having tuberculate seeds, and the question remains whether these species belong to Ramus I.

In support of his hypothesis of the polyphyletic of the old *Mammillaria*, Buxbaum presents evidence for the relationship of each of his *Mammillaria* segregates to a different more primitive genus. He relates *Mammilloidia* to *Neolloydia*, *Oehmea* to *Cumarinia*, *Leptocladia* to *Escobaria*, *Ebnerella* to *Neobesseya*, *Pseudomammillaria* to *Dolichothele*, and *Mammillaria* sensu stricto to *Coryphantha*. In general the evidence as he presents it greatly strengthens his position, but in some cases it is not convincing.

He derives *Pseudomammillaria* from *Dolichothele* because of similarity in habit, even though *Pseudomammillaria* does not share the peculiar floral structure of *Dolichothele*. Although the similarity in habit is evident, it is questionable how distinct this line is from *Ebnerella* in habit. For example, before Buxbaum saw flowers of *Dolichothele baumii*, he referred it with no special comment to *Ebnerella* on the basis of seeds and habit. He says (2) "As the seeds [of *Pseudomammillaria*] are pitted and perispermless, they . . . do not originate directly from *Neobesseya* as does the new genus *Ebnerella*." But since both *Neobesseya* and *Ebnerella* are described as having pitted and perispermless seeds, this is no reason.

Although some species of the old *Mammillaria* can easily be referred to one or another of the segregates on vegetative characters alone, others apparently cannot. The only known criterion in some cases appears to be the structure of the seeds. An important question that as yet remains unanswered is whether all species of the old *Mammillaria* will, when their seeds are known, be found to fit into these segregate genera and, perhaps, a few new ones. Or will it be found that some have seeds of intermediate structure, connecting the segregates of supposedly different ancestry? Buxbaum evidently did not transfer from *Mammillaria* to segregate genera all the species that should be transferred. Apparently he studied seeds of *M. guerreronis* and *M. zapilotensis* but was uncertain whether to refer them to *Leptocladia*. Are there other species that cannot be placed by their seeds?

Because of space limitations, Buxbaum (3) could not treat each genus exhaustively. Further details will be given in a series of supplementary papers, some of which have already appeared (e.g. 6). Sometimes there is no indication of how many and what species of a genus were

studied. Various seed characters are mentioned in the discussion or shown in the figures, and seeds are described in new and emended genera; but there is no systematic attempt to describe the seeds for every genus and higher taxon. Much of the information about seed structure of cacti is available only in the non-uniform terminology of various authors in scattered publications, and much of it is not available at all. It is therefore to be hoped that Buxbaum will give this information in concise form in his forthcoming book on the morphology of cacti or in some other publication.

Buxbaum mentioned the development of glandspines as a family tendency. Their occurrence in *Opuntia* as well as in this tribe may be due to such a tendency, i.e. to parallel evolution, or it may be due to persistence of an ancient family character. In any case, the distribution of glandspines in the "Euechinocactineae" suggests that here they may be monophyletic and at the same time is consistent with his view of phylogeny. They occur in the genus that he considers most primitive in each ramus, namely, *Sclerocactus*, *Ferocactus*, and *Coryphantha*. In higher members of these rami, unless the peculiar secretory spines of *Epithelantha* and *Encephalocarpus* are homologous, glandspines apparently are known only in *Hamatocactus* and *Escobaria*, which he derives directly from these primitive members. The fact that glandspines (apparently) are absent in *Echinocactus* suggests a loss there as in higher members of all rami. Such a loss is possible if present-day *Echinocactus* is thought of as near the ancestral type but not actually the ancestor of *Ferocactus*, etc.

Buxbaum's nomenclatural procedure leaves something to be desired. Most of his many new combinations lack any reference to descriptions, though he gives in each case the author of the basonym and sometimes the old generic name. Names of higher taxa are very informally proposed, with no descriptions nor even any indication that they are new; these names therefore are not validly published. The name "Euechinocactus," for example, is an afterthought, added as a subtitle (3). The taxon is not characterized, nor is there any explanation of why these North American genera are considered to form a phyletic unit.

Everyone is reluctant to accept a new classification that means changing names. However, Buxbaum's work cannot be quietly ignored. Unless his phylogenetic scheme can be refuted, a system of classification consistent with it must be adopted. To the reviewer it appears that some statements still need verification and that some interpretations are still open to debate.

If Buxbaum's phylogeny, based largely on seed structure, gives anything like a true picture,

it should be borne out by studies of other morphological details. At least three such studies are now in progress: Dr. Remski (Sister Marie Fidelis) is working on cytology, Dr. Norman Boke on developmental morphology, and Dr. E. B. Kurtz on pollen morphology. It will be most interesting to see whether these studies give any data to support or contradict Buxbaum's phylogeny.

The reviewer, who favors fewer and larger genera, has adopted a critical attitude but has found comparatively little to criticize. Dr. Buxbaum evidently has accumulated a great amount of original information and he uses it effectively. Many of his conclusions, once they are pointed out, seem inescapable. Undoubtedly, he is doing as much as anyone today to clarify the relationships of the genera of cacti.

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- (4) — Entwicklungstufen und Entwicklungslinien der Tribus Euechinocactineae, F. Buxb. Kakteen & andere Sukk. 2: 31-38. 1951.
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NOVEMBER AND DECEMBER MEETINGS OF THE CACTUS AND SUCCULENT SOCIETY OF CALIFORNIA 5161 Trask Street, Oakland

The 31 members attending the November meeting were privileged in hearing Mr. H. M. Butterfield, well-known horticultural authority of the University of California (Berkeley), speak on the subject of *Echeverias*; having long been interested in the better species and hybrids of this genus, Mr. Butterfield was well-qualified to review them for us. It was pointed out that an acquaintance with the older species was desirable in appreciating hybrids developed from them and necessary in planning a hybridizing program. With the aid of numerous plants from both his private collection and the UC Botanical Garden he first described and compared the more familiar species. It was illuminating, for example, to have the group related to or resembling *E. coccinea* including *E. setosa*, *E. pilosa*, *E. harmsii*, *E. pubescens* and *E. leucotricha* brought together so that their differences could be better understood, and to see their influence in hybrids such as *E. x "set-oliver"* and *E. x "Doris Taylor"*.

Carunculate *Echeverias*, a specialty of Mr. Butterfield, were represented by several fine specimens. The form most often seen in collections is *E. gibbiflora* var. *carunculata*, a plant considered by some to be repulsively cancerous in appearance and by others as extremely beautiful; however, its heavily-embossed leaves and fine color are detracted from somewhat by its leggy stem and slowness to propagate. Some years ago a carunculate hybrid that lacked these faults originated among his seedlings and will doubtless

prove more popular, being both stemless and offsetting freely.

Many other rare and interesting *Echeverias* were also shown and discussed, including *E. craigeana*, a recently-described species with compact, brownish-silver leaves; *E. subrigida* var. *palmeri*, a large, striking plant collected in Mexico several years ago by Robert Flores of Salinas; *E. longissima*, one of the neatest and most attractive, with extremely long flowers; the Peruvian *E. chilensis*, seemingly made of alabaster; and two new species soon to be described, both among the prettiest in the genus.

After seeing such a colorful display it is hard to understand why *Echeverias* have been neglected by collectors in recent years. Surely they still deserve the love and attention they inspired in the 30's when hybridists and botanists such as Victor Reiter and Eric Walther, as well as a host of enthusiastic amateurs, were occupied with them.

Concluding the meeting with a reading of the results of a recent questionnaire that had been mailed to all members. The 35 questions were asked in an attempt to learn what members thought of their society and some proposed changes planned by the officers, and encouraged them to state in what way improvements could be made. The returned, unsigned questionnaires were interesting and often helpful. Perhaps some of the other affiliates would like to try this means of improving their society.

The first and main event at the December meeting was our annual Christmas dinner, well-prepared by the Andrews and thoroughly enjoyed by all members. Either because of Christmas spirit or because a full stomach discourages arguments the short general meeting that followed proceeded with unusual smoothness. The following officers were re-elected for the 1954 term: Myron Kinnach, President; A. Irving, Vice-President; John Hastings, Secretary; W. C. Andrews, Treasurer. The meeting concluded with our annual drawing, some 200 attractively-wrapped plants having previously been placed around the Christmas tree. Also distributed was a flat of 80 newly-introduced or rare plants from the Botanical Garden.

COLORADO CACTOPHILES

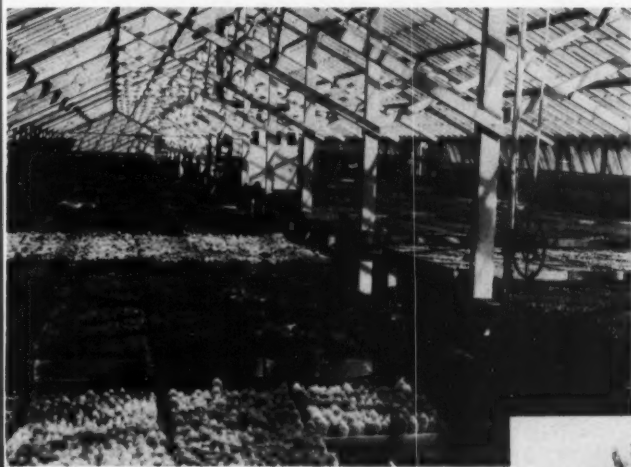
Officers were re-elected, as follows:
President—Mr. G. J. Tomlin
Vice President—Mr. Sam Heacock
Affiliate Director—Mrs. Melvin Willis
Recording Secretary-Treasurer—Mrs. Wm. Rutschman
Cor. Secretary—Mrs. Conrad Eckstein

OPERATION "BIG SHAMPOO"

The January meeting of Colorado Cactophiles was to have been held at the Eckstein Cactus Shack, but two days after Christmas a catastrophe struck! An oil stove which had been improvisely substituted for the burned-out electric heater, suddenly went haywire and poured volumes of greasy black soot over all 600-plus occupants of the greenhouse (henceforth to be dubbed the Smokehouse).

The cacti took it better than the other succulents, many of which lost most of their leaves and the early buds. The flowing white locks of the beloved patriarch "Gabby Hayes" and the others of the hairy group were the sorriest spectacle of all—except poor old *Opuntia* Liz herself, who went into complete temporary collapse over the fate of her darlings.

Loyal friends rallied 'round, and now, one month later, things look much brighter. A giant, economy size box of mild detergent, many gallons of warm water, and willing hands wielding soft shaving brushes or stiff pastry brushes, as each plant required, have completed Operation "Big Shampoo." Whew!



DISCUSSION WANTED

Mr. Editor:

This is in answer to inquiries regarding the introduction of the very desirable type of *Opuntia microdasys* that we have offered to the trade as Angora Bunny Ears. The same plant is distributed by Mr. Johnson under the name Angel Wings. This plant is not a sport, hybrid or commercial mutation.

In the nineteen thirties we were visited by the late Dr. Lowry of Laredo, Texas, who was one of those rugged, well educated men who studied the plants for relaxation. After the rigors of medical practice he spent much of his leisure time in the field. He had a remarkable com-

FIG. 32 (above). One of the two-hundred-foot greenhouses of Hummel's Exotic Gardens in Carlsbad, California. FIG. 33 (right) Mile-long rows of "The Old Lady of Mexico" (*Mammillaria bahniiana*) grown in the open as specimens and seed plants. FIG. 34 (bottom) "South American Old Men" (*Oreocereus celsianus*) insures abundance of seeds without depleting the seeds from native plants in Mexico. Hummel propagates the young plants at his Inglewood branch and then transfers them to the open field to insure sturdy stock.



mand of the Spanish language, coupled with his interesting ability to make the sophisticated listener understand the mystery of plant adaptation to desert conditions. Dr. Lowry was as much at home among the Mexican Peons as he was in the drawing room of society. During his years of study and exploration he found it possible to prove that the original describer's name of several species should hold good and not be placed among the synonyms of formerly described species.

In looking over our collection, Dr. Lowry noticed our *Opuntia microdasys albispina*, which we had imported from Haage Jr. of Germany. This plant had been given the common name of "Polka-dot Cactus." It was a very desirable

little plant when grown in plenty of light under select conditions but did not take well to greenhouse culture. He mentioned at that time a little plant, very similar, that he and Mr. Georgi of Mexico had found on one of their collecting trips. Only three plants had been found, growing in a very shady location.

Upon his return home Dr. Lowry sent us a cut of his plant and shortly after we received another cut from Pirtles Cactus Gardens at Edinburg, Texas. Upon first viewing the cuts we felt certain they were merely our Polka-dot Cactus grown under different conditions. We soon realized our mistake. The new plant took to cultivation immediately and unlike our plant did not elongate under normal shading. Numerous offsets gave promise of a vast supply of propagation for the wholesale trade we hoped to build. Today the familiar pad-opuntia form with entirely harmless white glochids makes it one of the most demanded Opuntias. Our minimum annual propagation for the past few years has passed the hundred thousand mark. Last year one shipment of five thousand was sent to Mexico City.

Shortly after we acquired this plant, Mr. and Mrs. Jones of Laredo, Texas, visited us and told us of receiving a few pots of the plant from a Mexican garden in their home town. We do not believe they knew the origin of this stock. Mrs. Crowninshield of Phoenix, Arizona, also told us of seeing the plant in the collection of a

Botanic Garden in Mexico City. The curator considered it as very rare as only eight plants had been found in several years. Mr. Tegelberg of Inglewood, mentions that on his recent trip to Mexico with Mr. Gates, he observed very similar plants growing sparingly in the same locale as *Cephalocereus senilis*.

We do not know but what this plant has been described in some botanical publication. Material sent to Germany was immediately identified as "*Opuntia microdasys albispina*." Letters requesting a comparison with the old type (Polka-dot) were not answered. We believe an open discussion concerning this plant as well as others of undetermined origination would be of interest to the JOURNAL readers.

Besides its adaptability to the Florist dish garden, we would like to add that Coastal Cactus Gardens would find it an interesting addition. At our home in the Rolling Hills of Rancho Palos Verdes, we planted some of our overworked stock from our nursery. The ability of this plant to capture moisture with their very fine spines has enabled it to establish in the semi-shade of the pine trees. Mature plants of the Angora Bunny Ears stays very miniature, seldom over eight inches tall while the Polka Dot forms long tongue shaped pads which often droop to the ground. Flowers are very similar, attractive yellow with bright green stigma are produced in quantity by Angora Bunny Ears but sparingly by the Polka Dot.

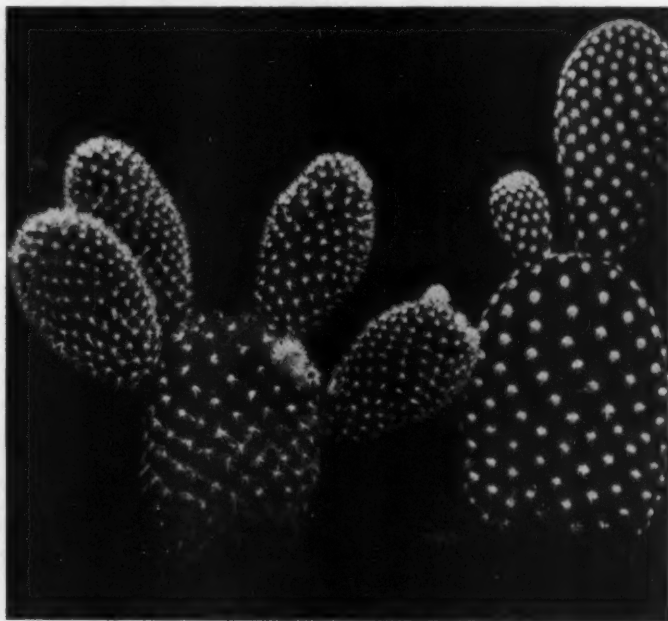


FIG. 35. Opuntias with harmless glochids. *O. microdasys albispina* on left. "Polka-dot" on the right.

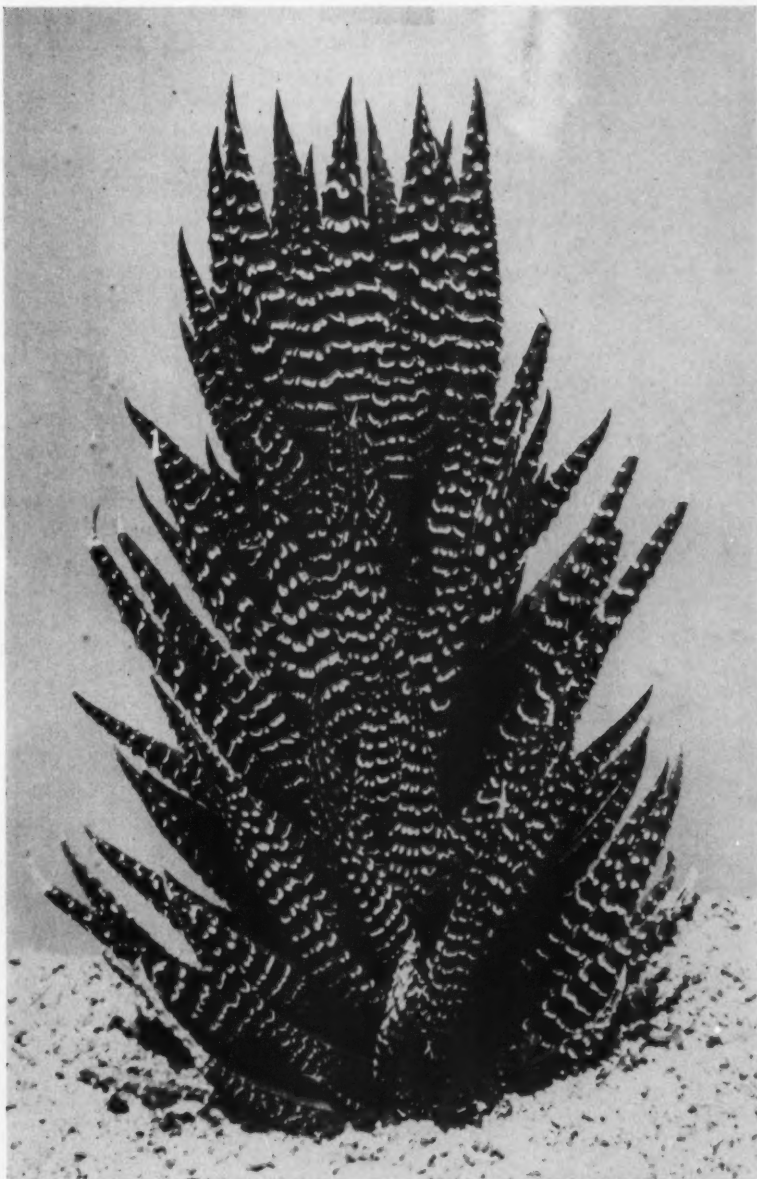


FIG. 36. *Haworthia reinwardtii* var. *chalumnensis* G. G. Smith nat. size.

Notes on Haworthias

J. R. BROWN

Haworthia reinwardtii var. *chalumnensis* G.
G. Smith in Journ. So. Afr. Bot. IX (1943)
99, fig. 5 & Pl. II.

Plant with leafy stems to 13 cm. or more in
length, 6.5-9 cm. diam., proliferous from the
base and forming clusters.

Leaves erect to erect-spreading, 4-6 cm. long, 13-16 mm. broad towards the base, lightly incurved, old leaves lanceolate, young leaves broadly-lanceolate, acuminate, occasionally somewhat falcate; face flat to somewhat rounded with an obscurely raised, concolorous lengthwise line, dark green becoming greenish-brown with age and with irregularly scattered small, whitish tubercles of varying sizes in the upper part and along the median line; back rounded, obscurely keeled but more distinctly keeled towards the tip, darker in color than the face and becoming brownish-green with brownish tips with age, with 12-14 transverse, more or less wavy rows of prominent, white, roundish to oblong tubercles, often confluent into almost continuous rows, these rows 2.5-3 mm. apart at the mid-area of leaf.

Habitat: Cape Province: East London Division.

This plant was collected by G. G. Smith on the banks of the Chalumna River, about 30 miles west of East London. In his notes, the author also states that it "differs from the type by its greater diameter, longer and more spreading leaves, more numerous transverse rows of tubercles on back of leaf and by these being mostly confluent. It differs from all other varieties of the species by its more spreading leaves and more confluent back tubercles. Compared with var. *conspicua*, which also has confluent tubercles, the tubercles are much larger and more conspicuous and the leaves are shorter and narrower."

This is a fine vigorous and outstanding var. of *Haw. reinwardtii* as may be noted from the illustration of a plant growing outdoors in So. California, while this plant shows a much greater diam., than that given by G. G. Smith, it was at the time growing very vigorously and when it had gone into the dormant stage it measured much less, about 7 cm. in diameter.

Haworthia batesiana Uitewaal in Nat. Cact. & Succ. Journ. III (1948) 101, figs

Plant stemless, 4-5 cm. in diam., proliferous from the base and forming dense clusters.

Leaves ovate-lanceolate to oblong-lanceolate, acuminate, 2-2.5 cm. long, 8-10 mm. broad, somewhat incurved towards the tip and ending in a bristle about 2 mm. in length; younger

leaves more or less erect, the older spreading, green, the older leaves towards the base and the young leaves of a paler green, obscurely lined with 4-5 darker lengthwise lines meeting at the tip, these lines obscurely anastomosing; face of leaves more or less turgid in the mid-area; back of leaves rounded and keeled in the upper part; margins and keels may be irregularly toothed with very minute, scarcely 0.5 mm. long pellucid teeth, or often without teeth, the margins and keels often with an entire or more or less interrupted, narrow, semi-pellucid band from which the minute teeth, when present, arise.

Peduncle simple, slender, 16 cm. or more in length including raceme; sterile bracts few, 4-6 mm. long; pedicels about 3 mm. long, the bracts longer; perianth 13-15 mm. long, tube obclavate, triangularly rounded, white tinged pink, the recurved segments white tinged pink with greenish-brown keels.

Type locality: Cape Province: Graaff Reinet, Valley of Desolation.

Named in honor of J. T. Bates of England, a noted collector of Haworthias.

This *Haworthia* has been placed in the sect. *Muticæ*, and is distinct from other plants in this section by the somewhat dull green color and the obscure reticulating lines of the leaves. At certain times, varying with growth conditions, the network of lines may be more pronounced against the pale green background of the leaves. Uitewaal suggests that the great variation which occurs in the number of teeth present on the margins and keels may be due to conditions under cultivation, however, this would seem to be unlikely, as plants (of different clones) have been grown under varying conditions and this great irregularity is always present; sometimes an entire rosette may be without apparent teeth and again leaves may occur bearing very numerous teeth. This character also occurs on other *Haworthias*.

Haworthia batesiana is a very prolific plant and it appears best when about the size of the plant shown in the illustration, which is of a plant growing outdoors, as it seems to lose much of its identity when a large cluster is formed. This *Haworthia* seems to be fairly well distributed, as it was in cultivation in this country for some time prior to its being named.

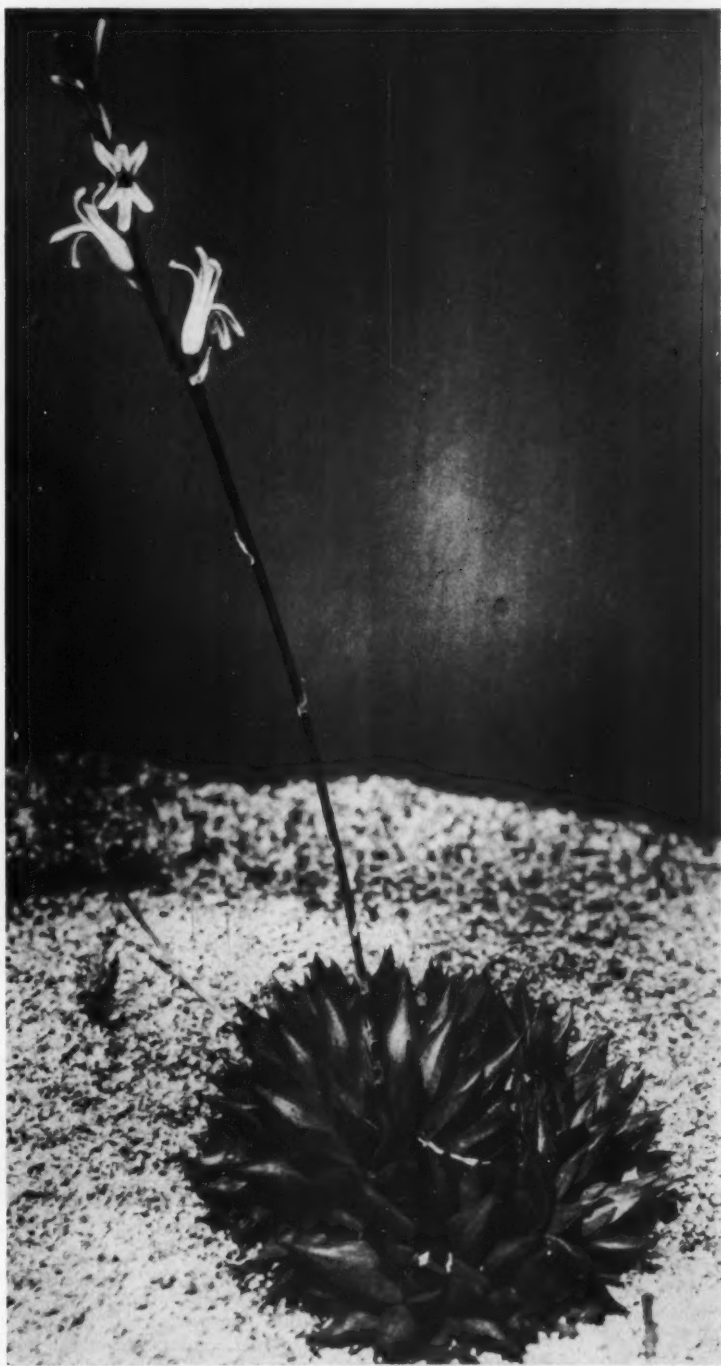


FIG. 37. *Haworthia batesiana* Uitewaal nat. size.

AN EDIBLE EUPHORBIA

Although many members of the gigantic genus *Euphorbia* are well known for the toxic qualities of their juice, one in particular is noteworthy as a fodder plant in South Africa. This succulent, *Euphorbia esculenta* Marl., is described by White, Dyer and Sloane (*The Succulent Euphorbiae* 1: 384-387. 1941.) as follows: "The distribution of *E. esculenta* was perhaps more extensive 80 years ago than it is today, for where used as fodder it has been dug up without method and no attempts have been made to restore new plants. Yet no general use of the plants for food was ever made. Comment on the fact goes back at least to 1865, when John Kirkman of the Field Cornetcy of Advice wrote in the *Uitenhage Times* (Dec. 1, 1865): 'The state of the country can scarcely be worse than it is here. We have had no rain for 11 months and the loss of stock is frightful... I am now feeding my cattle on the *vingerpol*, or Dwarf Euphorbia. It is a great pity farmer do not cultivate it and preserve it specially for dry seasons. In 1859 I fed the whole of my cattle on it alone for six months. I am now feeding 100 head on it, and up to the present time have not lost any.' There is little doubt that the plant referred to was *E. esculenta*, and a similar plea

for its general use was made early in the present century by Marloth. During all his residence in South Africa he urged the farmers of the Karoo to avail themselves of the nutritious drought-resisting plants of their localities, and in particular he deplored the fact that no concerted use of *E. esculenta* was made during the disastrous drought of 1919. He had plants analyzed and found that dried material contains twice as much nitrogenous matter as mangolds and thirteen times as much fat, and that the digestible carbohydrates amount to about half those of that crop."

THE GENUS TAVARESIA

Named in honor of José Tavares de Macedo, a one-time official of the Ministry of Marine and the Colonies for Portugal, by Welwitsch, *Tavaresia* is today a rather uncommon genus in cultivation. These plants, however—of which there are three known species—are among the most fabulous of all the stapeliads, and are decidedly worthy of more extensive cultivation by enthusiasts. Their rather large flowers are magnificent, and the rather cactus-like plants are ornamental even when not in bloom. Some more comprehensive notes, with illustrations, will shortly be given in THE JOURNAL.

TWO INTERESTING YUCCAS FROM MEXICO

WILLIAM HERTRICH

Reprinted from "Lasca Leaves"—The official publication of the Southern California Horticultural Institute and the California Arboretum Foundation, Inc.

INCLUDED in the xerophyte collection of the Huntington Botanical Gardens, San Marino, California, about 120 *Yucca* plants are growing, embracing some 30 species, and as many more varieties. Most of these are indigenous to southwestern United States, some along the southeastern coastal states, and others from south of the border in Mexico.

Practically all *Yuccas* adapt themselves very readily to climatic conditions prevailing in southern California. The species range in size from the 24" *Y. tenuistyla* to the giant *Y. australis* from Mexico which attains tree-size proportions—i.e. 40 ft. or more in height, with proportionate top.

Most *Yuccas* respond to the same cultural treatment that successfully develops other plants. Some species, however, if planted in soil over-rich in plant nourishment, and provided with more than adequate water, grow too rapidly, becoming top-heavy. This condition causes them to bend over in wide arch form; in some instances they bend low enough to make contact with the ground and to take root at points of contact. This curious habit has been particularly manifest in one specimen of *Y. valida* in the Huntington Gardens which in 1925 was planted as a small plant in its present location.

Prior to 1925, the area in these gardens



FIG. 38. *Yucca valida*, close-up of flowering stalk.

where the *Yuccas* are now growing was a large reservoir used for storing water for irrigation purposes. Subdivision of adjacent land for homesites made the reservoir obsolete; it was filled in with soil and became the foundation of what is now part of the cactus garden. The top soil used was

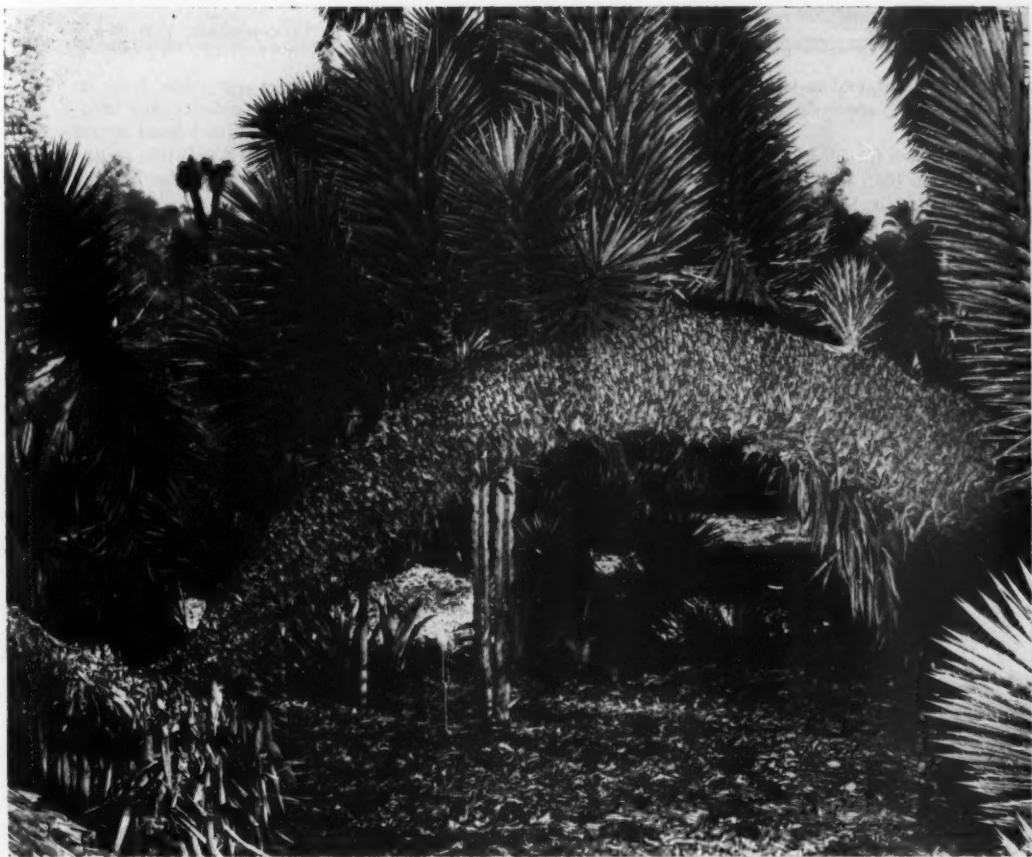


FIG. 39. *Yucca valida* showing wide arching of trunk and upright terminals.

ideal as a medium for good plant growth, and as a matter of fact proved too rich for certain plants placed there, as was the case with this one *Y. valida*. It put on more than ordinary growth for such a plant in a given time, and after being established for a few years in its new location, formed several trunks, the first of which produced its first flower spikes in 1935. Blooming each successive year in increased number of blooms, it produced in July and August of this year, 1953, 39 inflorescences ranging in size from 15" to 20" in height, on stems up to 14' tall. Through the years, the stem terminals, after the blooming period, have branched and re-branched, forming multiple heads in time which have become increasingly large and heavy to the point mentioned above—of bending the trunk slowly to form an arch and ultimately bending far enough to make contact with the ground. At these points of contact roots have formed, establishing new plants severed from the parent plants.

One especially interesting factor connected with the arching of these stems is the breaking of new terminals on the upper side of the arched trunk. This feature has been noted on only one other species—*Y. australis*: it occurs in exactly the same manner except that the species *australis* did not bend far enough to make the contact with the ground. The two species, *Y. valida* and *Y. australis* are similar in some aspects of appearance as well as growth; *Y. valida*, however, has shorter leaves, does not grow as tall as *Y. australis*, and bears its inflorescences in upright position, while *Y. australis* produces leaves 18" to 24" long, forms trunks that are heavy, and excessively swollen-appearing bases, besides bearing pendant inflorescences from 3' to 6' long.

Of the 39 flower spikes produced on the large specimen of *Y. valida* this year, 18 were produced on terminals of self-layered stems, of which 5 are rooted and 3 not yet rooted. The total number of terminals of all sizes was 190. The approximate spread

of the plant, east to west, this summer of 1953, was 37 ft.; approximate spread north to south, 35 ft.

The two species of *Yucca* under consideration here are both indigenous to Mexico; however, *Y. valida* is found in Lower California and

northeastern Mexico but *Y. australis* only in northeastern Mexico. Both species are commendable as ornamental plants of a bold nature and will do well in almost any locality in southern California including the warm dry interior valleys.

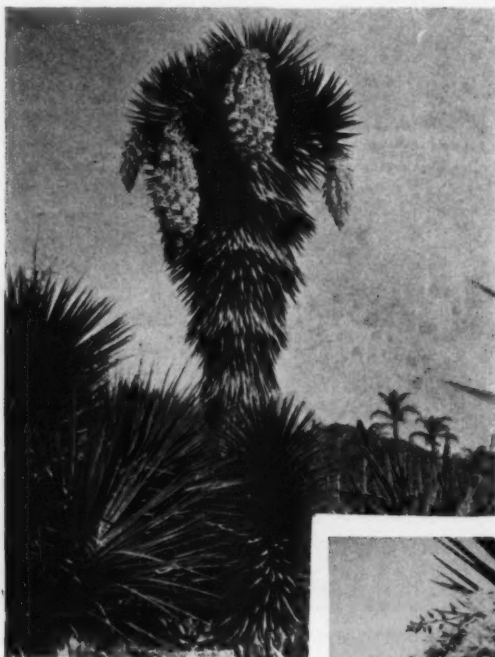


FIG. 40. In the Huntington Gardens, from a certain vantage point the pendant flowering species is a tall accent behind the sprawling, wide-arching *Y. valida*.

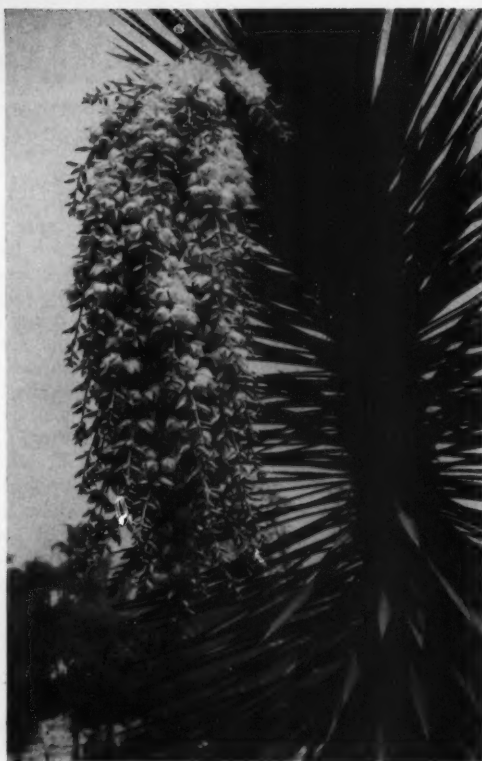


FIG. 41. Close-up, showing the pendulous nature of the inflorescence of *Yucca australis*, contrasted with the upright inflorescence of *Yucca valida*.



FIG. 42. Base of *Cephalocereus senilis* near Venados, Hidalgo. Note clusters of Bromelias and lichens on main branches.

MORE ABOUT MEXICO

By HOWARD E. GATES

Photos by E. YALE DAWSON

At Antiguo Morelos, we turned inland again to climb over the mountains to Ciudad del Maiz (Corn City). These mountains were largely forested with oaks. In places, there were colonies of *Beaucarneas*. Their swollen bases were not as large as those of the species at Zapotitlan. After crossing the summit, there was not much of real interest to us until we came to some hills well to the east of San Luis Potosi. On the slopes were bright red *Ferocactus pringlei* and numerous species of *Mammillarias*, *Coryphanthas*, *Neolloydias*, *Echinofossulocacti* and *Echinocacti*. Large *Cereus* were absent except in a broad valley filled with very large *Myrtillocactus geometrizans*. We found a fellow in the shade of one of these, stripping leaves

of a small *Agave* through a rude comb to secure fibers from twelve to fifteen inches long. Later we saw bundles of these fibers on sale in the city markets.

In this section the farmers all live in the towns, often going out several miles to work their farms. This is rather an arid section so probably the towns are built near the good water supplies. We photographed one fellow driving a team of oxen hitched to a high wheeled cart. His plow was a wooden one, apparently made from one piece of wood.

San Luis Potosi we found to be an interesting city with good accommodations. We were glad to be in a motel as there were several rainy nights. From there our route swung southwest via Lagos de Moreno to

Guadalajara. Enroute we were surprised to find a number of towns where there were as many blue eyed blondes as there would be in a Swedish village of Minnesota. We did not have the time to satisfy our curiosity as to the origin of this racial group.

West of Guadalajara, on the lava flows of Ceboruco, we found *Cephalocereus leucocephalus*, *Acanthocereus*, *Hylocereus*, *Pereskopsis*, and great terrestrial orchids growing in what appeared to be almost sterile soil between the chunks of broken lava. *Cephalocereus leucocephalus* is another of the much branched, slender, with the flattened apple fruits. The cephaliums were tufts of very long white hair arising from one side of the branch. These were the longest hairs we saw on any *Cephalocereus* and Dr. Bravo reports that they are utilized in the weaving of textiles. The only other place on this route from Guadalajara to Tepic that we saw strikingly large cactus, was in The Barrancas, a very deep canyon that held up highway building for many years. In the lower parts were *Pachycereus* and large *Lemaireocereus*. As we neared the top on the way out, I stopped to make a kodachrome of the rugged terrain. In the meantime, Dr. Dawson investigated a pile of horse droppings and made a rich haul of brilliant green beetles.

In Tepic we found a new motel with pleasant accommodations facing a patio. On one wall of the patio was an exquisite shrine backed by a tile design. We made a side trip to the sea at Miramar over the partially constructed roadbed of a new highway via Jalcoctan. The farmers were busy clearing the hill-sides in preparation for banana planting. The building of good roads immediately results in other forms of progress even in the by-ways of Mexico. Towards the coast, we passed through a dense belt of cocos type palm which the native call the oil palm. These palms were often left standing when the ground was cleared for planting. The object of this rough side trip was to re-locate a stand of tree ferns that Dr. Dawson found late in 1946. These were the only tree ferns known to grow on the Mexican west coast. When we finally arrived after travelling some beastly roads, we found that the clearing of land for agricultural purposes had exterminated the colony. So we do not know whether another species has disappeared from the face of the earth or not. We passed many stands of slender, tall bamboo and noted several species of *Philodendron* and *Nephytis* but not much in the way of cactus except *Acanthocereus* which are nearly always along the Mexican coast. There were numerous highly-colored birds in various kinds and sizes.

Between San Blas and the large beach hotels to the south, we found a crew laying paving stones. Mexican stone roads are always rough travelling, so we inquired as to why they were using stones instead of asphalt. We were told that it was cheaper as the laborers picked up the stones from piles beside the road bed and hammered them into place for the equivalent of fifteen cents a square meter which is larger than a square yard. In Spanish colonial days San Blas was the chief port of the Pacific coast with a well made pack train road connecting it with Vera Cruz via Mexico City. Now aside from the resort hotels in the suburbs, it is a sleepy fisherman's village nestling under the giant cocoanut palms. Green cocoanuts were on sale and we found their milk a very refreshing drink.

The road north to Mazatlan was near the hills at the upper edge of the coastal plain. There were numerous savannas bearing a good stand of slender trunked fan palms. We drove off the highway on to a nice looking place to camp. However the mosquitoes and gnats were so thick, by the time we had a bite to eat, we were ready to take to the road for the several hours ride after dark to Mazatlan. We found lodgings

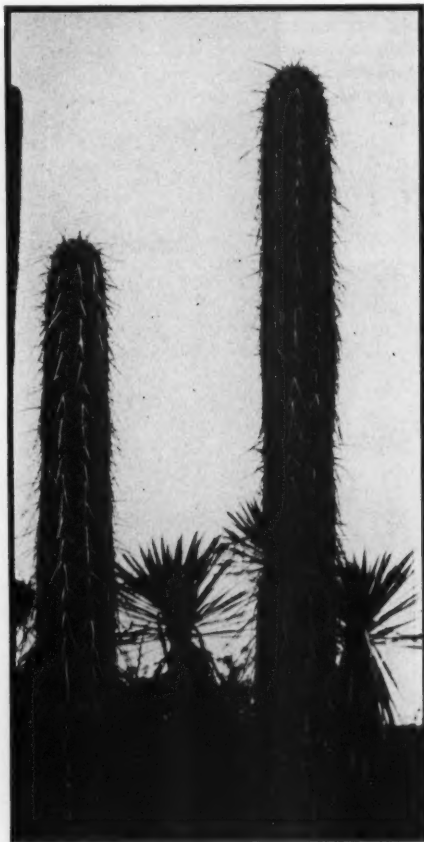


FIG. 43. Tips of *Lemaireocereus bollianus* near Tehuacan, Puebla.

in a twelve story steel frame building that still was not completed though years have been spent in its construction. In the ground floor lobby we found a mason setting stone floor tile. This fellow told us that he was getting twelve pesos a day, equivalent to a dollar and a quarter, for this skilled work. Dr. Dawson left long before daylight, to make a boat trip to the islands off shore for collections of marine plants. He is one of the few marine algologists of the world and this trip helped him to complete a comprehensive collection of the algae, sea weeds to most of us, from the Mexican west coast.

Just outside of Mazatlan, were good stands of *Pachycereus pecten-aboriginum* and some *Cephalocereus purpusii*. This is another of the slender, more branched *Cephalocereus* with the flattened fruits. Somewhat farther north, we found a few of the little known *Lemaireocereus martinezii*. This is a large much branched plant with a dark green, rather oily looking surface. The ribs were approximately nine, which is considerably less than in *Lemaireocereus thurberi* and the spines were darker. The fruits were immature but promised to develop into a spine covered Pithaya somewhat similar to *L. thurberi*.

At Culiacan, we bade farewell to paved highways and began a rough ride through two hundred miles

of thorn forest interspersed with farming communities. The road had been coated with rock and coarse gravel but seldom smoothed with a grader, so we were continually bouncing along. In places we were able to use the un-completed road bed of the new highway. The grade for this road was built high and wide and was being surfaced with heavy layers of asphalt. When completed early in 1954, it will be better than any highway that we saw in all of Mexico.

At Los Mochis in the northern part of Sinaloa, we turned off over a gravelled road leading to Topolobampo. Here was a small range of hills with great arms of the bay running back between them. The small village with its pier and railroad terminus, is nine miles from the harbor entrance. The chief industry other than that of transportation was the large shrimp fishing and cannery project. As soon as the manager of the shrimp cannery learned of Dr. Dawson's desire to collect sea weeds at the mouth of the bay, he placed one of the company's landing barges at our disposal. So instead of spending two days there, all of Dr. Dawson's work was completed in one. Our return to Los Mochis was over a natural road that was much more comfortable than the gravelled road.

After leaving Los Mochis, we were soon deep in the thorn forest again. We found many *Pachycereus pecten-aboriginum*, *Lemaireocereus thurberi* and *Lophocereus schottii*. Both the *thurberi* and *schottii* were quite different from those we were familiar with in Lower California. There were fewer branches and they were both taller and more slender.

Twenty-two miles south of Navajoa, we again reached the pavement for an easier ride across Sonora than we had across Sinaloa. Gradually the flora changed. Both *Pachycereus pringlei* and *Carnegiea gigantea* began to appear. These are larger and more massive than the *P. pecten-aboriginum*. The small green parrots which had been with us in abundance as we crossed Sinaloa disappeared.

As we skirted the bay between Empalme and Guaymas, we were interested in an island hill that was forested with *Pachycereus* in contrast to the more barren mainland. In Guaymas, we visited with a research scientist employed by the shrimp fishing industry which is much alarmed at the recent falling off in the shrimp catch. Possibly this is the result of a vicious cycle set in motion by the action of man. Some of the islands in the Gulf of California are nesting places for large colonies of sea birds whose dropping fertilize the water. Native fishermen in dug out canoes visit these islands to secure the birds eggs for market. Upon arrival they smash every egg they can find to insure that those collected a few days later are all fresh. Naturally this reduces the bird popula-

tion which in turn reduces the fertilizer supply for the small floating vegetable and animal life forms collectively known as plankton. All forms of marine animal life depend upon a sufficient supply of plankton. The smaller fish and marine animals eat it and the larger fish eat the smaller ones and the birds live off of the fish, so one broken link in the cycle upsets everything.

Just north of Guaymas, we made a short side trip to San Carlos Bay, which snuggles back into the hills which are dominated by a higher peak tipped with twin volcanic cores, known locally as "The Goat's Tits." Overlooking the bay were large plants of *Ferocactus covillei*, *Mammillaria sbeldoni* and *johnstonii*, and brightly colored, short-spined *Echinocereus scopulorum*.

On the way northward to the border at Nogales, we saw scattered stands of Carnegias. The most interesting plant of the district occurred in colonies between Hermosillo and Guaymas. It is the very heavy *Fouquieria macdougalii* which makes much branched small trees to fifteen feet high with red flowers. It is much different from the slender branched *Ocotillo*.

Here in a few minutes of reading I have tried to compress the most interesting things of more than five thousand miles of travelling in Mexico. It took six weeks, but every day was interesting.

New Format for Horticulture Magazine

"Horticulture," America's oldest garden magazine, has a completely new format featuring six pages of natural color. This popular monthly magazine devoted primarily to amateur gardening, America's most popular hobby, has had wide acceptance throughout the United States and Europe. The lavish use of color is a new departure in garden magazines according to Arno H. Nehrling, Director of Publication of the Massachusetts Horticultural Society. This innovation has been made in conjunction with the 50th Anniversary of "Horticulture" and the 125th Anniversary of the Society both to be commemorated in 1954.

"Horticulture" was launched half a century ago at 11 Hamilton Place, Boston, just a block from Beacon Hill. It was purchased by the Massachusetts Horticultural Society in 1923. Edward I. Farrington, then Secretary of the Society served as Editor for a quarter of a century. In 1947, William H. Clark of the Boston Globe succeeded Mr. Farrington. The present Editor is Daniel J. Foley. Subscription price: 1 year \$2.50, 2 years \$4.50, 3 years \$6.00. Address Horticulture, 300 Massachusetts Ave., Boston 15, Mass. (The October issue contained a full page color plate of *Harrisia bonplandi*.)

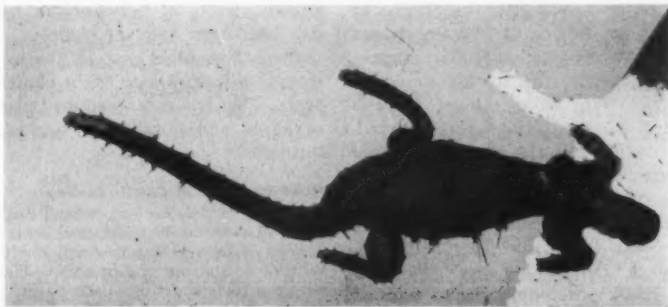


FIG. 44. I am sending a photograph of a cactus plant that has grown in the fantastic shape of a lizard.—M. MANAL, Bombay, India.

A New Species of *Echeveria* from Hidalgo, Mexico

By REID MORAN

NOTE: Photographs will be shown in a later issue of this JOURNAL.

Echeveria semivestita, sp. nov.

Caulis elongatus; folia subremoto, oblanceolata, acuta, supra canaliculata, pubescentia, 11-14 cm. longa, 1½-3 cm. lata; inflorescentia paniculata, glabra, glauca, cincinnis 6-9; sepala inaequalia, ascendentia, purpurea; corolla rubella, 11-13 mm. longa. Ab aliis speciebus foliis pubescentibus in inflorescentia glabra glaucus differt.

Stems to 2 dm. or more tall, 1-2 cm. thick, green, puberulent, producing roots and branches from the lower leaf scars. *Rosette* of about 15 leaves, covering about 5 cm. of the stem, the upper leaves close-set, the lower more scattered. *Rosette leaves* dark green, often purple-margined, puberulent with simple hairs about ¼ mm. long and sometimes enlarged at the tip, oblanceolate, acute, fairly keeled dorsally, channelled ventrally to within 1 cm. of the base, 11-14 cm. long, 1½-3 cm. wide, the blade 3-4 mm. thick, the base subterete, 10-12 mm. wide, about 1 cm. thick, with a triangular spur 1-2 mm. long but appearing longer as the leaf withers. Old leaf scars subcircular, about 12 mm. wide, faint, the area of attachment and abscission subelliptic, 3-6 mm. high, 9-12 mm. wide, brown, conspicuous, the bundle scar solitary, subcircular, 2-3 mm. wide. *Floral stems* axillary, 3-5½ dm. tall, about 1 cm. thick near the base but flaring somewhat to merge with the stem, grading from puberulent below through papillose at the base of the inflorescence to glabrous above, with 15-25 leaves below the inflorescence. *Cauline leaves* green, puberulent, the lowest similar to the basal, 3½-5½ cm. long, 2-2½ cm. wide; diminishing upward, those below the inflorescence elliptic, 2 cm. long, 1 cm. wide; intergrading with the bracts, which are glaucous, the upper essentially glabrous. *Inflorescence* about 1 dm. high and wide, of 6-9 cincinni, each about 5 cm. long, with 6-9 flowers; all parts except the main axis and its bracts glabrous and glaucous. *Bracts* of the cincinnati one per flower, at first imbricated on the under side of the sympodial axis, elliptic, acute, purple, glaucous, the lowest about 12 mm. long and 5 mm. wide. Lower *pedicels* 1-5 mm. long, 2-3 mm. thick, flaring upward. *Sepals* free, ascending, elliptic-oblong, acute, not or scarcely narrowed at the base, purple, glaucous, unequal, the lower two smallest, nearly equal, 5-7 mm. long, 2-2½ mm. wide, the two lateral nearly equal, 11-13 mm. long, 4-5 mm. wide, the upper 9-12 mm. long, 3-4 mm. wide. *Corolla* conic, 12-13 mm. long, 7-8 mm. wide at the base, 3-5 mm. wide at the mouth, coral pink. *Petals* imbricate, connate 3-4 mm., lanceolate,

acute, pink on keel and at tips, yellowish on edges and within, glaucous, about 3½ mm. wide, thick and strongly keeled, the inner surface flattish except for a hemispheric hollow at the base and a longitudinal furrow in which lies the stamen. *Filaments* yellowish white, the free part about 4 mm. long; epipetalous attached at upper edge of hollow, hence about 3 mm. above base of petal; antesealous attached at about the same level but more clearly distinguishable below. *Antthers* yellow, 2-2½ mm. long. *Scales* white, about 1 mm. wide. *Pistils* about 8 mm. high; ovary white, 5 mm. high, with numerous ovules on intruded placentae; styles green, 3 mm. long.

Type specimen number 985641 in the Herbarium of the University of California, Berkeley, a seedling raised by Mr. Robert J. Taylor of El Cajon, California, and sent by Dr. John Poindexter of Occidental College. The mother plant was collected by Mr. Taylor in February, 1948, by the Pan American Highway about 25 miles north of Zimapan, Hidalgo, Mexico, at about 7000 to 8000 feet elevation. It grew in black leafmold in crevices in rock under trees.

Two other collections in the herbarium of the Bailey Hortorium are also referable to this species: *H. E. Moore* 3417. On limestone boulders, dry rocky pine-oak woods, Puerto de la Zorra, near km. 284 on highway northeast of Jacala, Hidalgo, alt. 5000 feet, 16 July, 1947. "Flowers coral pink; bracts bluish green; leaves dark green, fleshy, with deep green border." *H. E. Moore* and *C. E. Wood* 3953. Steep ledges of road cut between kms. 294 and 296 on highway near La Cherimoya, between Jacala and Santa Ana, 12 July, 1948. "Leaves fleshy, boat-shaped, deep green with purplish margins; flowers coral-pink; sepals glaucous."

Echeveria semivestita differs from all other known species of *Echeveria* in having puberulent herbage and a glabrous inflorescence. Among the other species with non-glabrous leaves, only *E. pilosa* has a paniculate inflorescence. That is a short-stemmed plant with shorter leaves and floral stems and is longer hairy throughout.

MORPHOLOGY OF CACTI—Buxbaum

A study of the development and shape of each plant organ is necessary to understand evolution and classification of cacti. These original, English editions are valuable to students and botanists. First section deals with the roots and stems. 100 pages, 180 photos and drawings, \$3.50. Part II—The Flower. Contains 80 pages and 300 illustrations, \$3.50. Part III—The Fruit and Seeds, available in the fall of 1954.



FIG. 45. 'Conway's Giant' is one of the large red-flowered hybrids.

Plant of the Month - 'Conways Giant'

GERTRUDE W. BEAHM

One hundred and nine years ago Epiphyllum hybrids under the name of Phyllocactus were apparently raised, described and enjoyed much the same as today. It is true we have added modern methods of fertilizing—liquid, chemical and leaf feeding, new ways of pest control, etc., but in the main we think of and treat them basically the same as long ago. The following are excerpts from an article published in England in 1845 by F. A. Walton. Note spelling of Phyllocactus both single and double L also use of word Epiphyllum to designate Zygocactus types.

PHYLLOCACTUS

"These magnificent large-flowering Cacti are the best known of any. They are rapidly gaining in favour with both amateur and professional horticulturists; there is every indication of their becoming the *Fashionable Flower* of the future, being quite as attractive and more easily grown than Orchids. The attention of Continental

growers has for years been directed to raising new hybrids of increased size and beauty. Now some of the varieties have magnificent blossoms from 9 to 12 inches across. The colours have been much improved, and lovely art shades of pink, salmon, orange, and violet have lately been added to the already long list of beautiful varieties.

"In all the list I give there is not a single bad or even poor flower. (420 named varieties.) All are good, but some better than others."

They are easily propagated from cuttings or

*From among the large list of Phyllocactus offered in 1845 here are a few of the varieties still in the trade and well known: Agatha; Aurore boreale; Conway's Giant; Couranti; Cooperi; crenatum; Dante; Elegans (now Padre) Gen. Garibaldi; Cordonianus; Jenkinsonii; Jules Schlumberger; Kermesinus magnus; La France; Lilas solferino; Magenta (now called Scheherazade); Medaille d'Or; Mons. Jolibois; Niobe; Orion; Sarah Courant; Triomphe des Antheux; Triomphe de Poissy; Wrayi.

raised from seed, and as any one of them can readily be hybridized with any other, or even with many of the *Cereus* or *Epiphyllum*, it is easily seen the immense field that is opened to the amateur who is prepared to wait a few years for the result. Every seedling raised will be worth growing, and if a new type should result it would be valuable. Large plants are easily grown in a few years; even in a cottage window I have seen splendid specimen plants covered with dozens of flowers. No plant, in my estimation, gives such results for so little trouble. My list is long, but I am continually adding to it new varieties sent me by friends and correspondents. I have, I believe, one of the best collections in England.

CULTURAL DIRECTIONS

Phyllocactus are furnished with a great number of *absorbing* pores, and very few *evaporating* pores. They can, therefore, take in from the atmosphere when damp, or during rain, a large amount of moisture in a short time, and retain it for a long period even in the hottest and driest of weather. This capacity of holding their moisture makes it possible to send them long distances without serious injury. I have myself had many plants sent from the almost inaccessible regions of Mexico or Central America, that have been months upon the journey, and yet after a little careful nursing become well-established plants.

In growing any plants, we should always try to imitate nature as far as we can. To do this with Phyllocactus we should give them a good quick growing time, a ripening period and a long rest, that is, if we desire to get the best possible results. More Cacti are killed by too much kindness than by neglect.

WATER should be given sparingly but as the summer comes on they will do with a good supply. I myself always water my plants *twice* within an hour to insure a thorough wetting, and then let them get rather dry before watering again. This prevents the soil becoming sodden or sour. The *Epiphyllum* (*zygocactus*)

and other winter-flowering kinds, however, want more water during the time of flowering. Also, the *Phyllocactus* (*Epiphyllum*) should be watered rather earlier than the generality, say the end of February, as they form their abundant flower buds and are in full flower in April and May. Water should not be used overhead with a hose or syringe during the heat of the sun, but early morning and evening. Phyllocactus like a moist damp atmosphere during their growing season, and do admirably. They will then make rapid growth, which can be ripened by giving plenty of air in September and October. The resulting bloom next spring will be marvellous and well repay the trouble.

IN POTTING care should be taken to put plenty of drainage in the pots, say one-third their depth, and then put a little rough fibre from old turf or a little moss to prevent the soil clogging up the drainage. The soil should, in all cases, be porous and sandy and some fine leaf mould is useful for the faster-growing sorts, or a little *well-decayed* stable manure helps the Phyllocactus and some others, but be careful that the soil is not *too* rich, or your plant will suffer. Take the plant to be repotted, remove all dry or dead roots, shake off the soil that will come away, then select a pot not much larger than the old one (in fact, in many cases, I have used the same size), put a little soil in on top of the drainage, then place in the plant, putting the soil well between the roots, and press down well with a stick until firm. In case of fresh plants, or where all the roots have been removed, put a handful of sand in the centre of the soil in the pot and press the base of the plant into this. Keep a little moist, (very little) and shaded until the roots commence to form.

PROPAGATION. Many kinds are propagated by cuttings or off shoots. Cut these off with a sharp knife, place the cuttings in the sun for a few days until the cut portion is well dried and hard. Then put into sandy soil with a little pure sand round each cutting. Keep dry or nearly dry for a week or so, and then water sparingly until growth has commenced."

"ALOE OF SOUTH AFRICA" REDUCED TO \$11.50

Because of the large sale in the USA the publishers in South Africa have allowed us as a liberal discount that we can pass on to purchasers. The monograph of 650 pages is one of the finest botanical books ever published and contains 572 illustrations and 75 beautiful color plates of Aloes in their natural habitat. Order a copy while it is still available; it will be a good investment in years to come. Copies will be mailed direct to you from South Africa for \$11.50 postpaid or from stock in Pasadena plus 35c postage, foreign 60c. Sales in California please add 3% sales tax.

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Recent Publications

The material to appear under this title is intended to call attention to recent literature pertinent to botanical and/or horticultural study of succulent plants. It will appear in a form adaptable to pasting on 3 x 5 inch index cards for author- or subject-indexing. Reprints will be made available annually at cost. These will be printed on one side of a gummed paper. Suggestions for additions or emendations will be gratefully received.*

CARDENAS, Martin 1950

"Cactaceas Nuevas de Bolivia, I"

Lilloa 23: 15-27, 1950

Pereskia diaz-romeroana Cárdenas, sp. nov.

Lilloa 23: 15, fig. 1, pl. 1, 1950.

Opuntia tayapayensis Cárdenas, sp. nov.

Lilloa 23: 18, pl. 2, 3, 1950.

Opuntia chuquisacana Cárdenas, sp. nov.

Lilloa 23: 20, fig. 2, pl. 4, 1950.

Opuntia chuquisacana Cárdenas, sp. nov.

Lilloa 23: 20, fig. 2, pl. 4, 1950.

Opuntia alko-tuna Cárdenas, sp. nov.

Lilloa 23: 23, fig. 3, pl. 4, 1950.

Opuntia posnanskyana Cárdenas, sp. nov.

Lilloa 23: 25, fig. 4, pl. 5, 1950.

CARDENAS, Martin 1951

"Notas Cactológicas de Bolivia"

Revista de Agricultura (Cochabamba)

No. 6: 1-13, 1951.

[Article dated Dec., 1950]

Parodia comarapana Cárdenas, sp. nov.

Revista de Agricultura (Cochabamba)

No. 6: 3, fig. p. 4, pl. opp. p. 6, 1951.

Weingartia pulquinensis Cárdenas, sp. nov.

Revista de Agricultura (Cochabamba)

No. 6: 5, fig. p. 4, pl. opp. p. 6, 1951.

Weingartia pulquinensis Cárdenas var. *cor-*

roanus Cárdenas, var. nov.

Revista de Agricultura (Cochabamba)

No. 6: 9, fig. p. 4, pl. opp. p. 10, 1951.

Echinopsis rojasii Cárdenas, sp. nov.

Revista de Agricultura (Cochabamba)

No. 6: 10, pl. opp. p. 10, 1951.

Echinopsis rojasii Cárdenas var. *albiflora*

Cárdenas, var. nov.

Revista de Agricultura (Cochabamba)

No. 6: 12, 1951.

CARDENAS, Martin 1951 [March]

"Notes on Eastern Bolivian Cactaceae"

National Cactus & Succulent Journal 6

(1): 8-9, 1951.

Frailea chiquitana Cárdenas, sp. nov.

National Cact. & Succ. Jour. 6 (1): 8,

1951.

Bolivicereus samaipatanus Cárdenas var.

divi-miseratus Cárdenas, var. nov.

National Cact. & Succ. Jour. 6 (1): 9,

1951.

[This publication antedates that of the genus and species]

CARDENAS, Martin 1951 [May-June]

"Twee nieuwe Cereussorten"

Succulenta 1951 (3): 33-36, 1951.

Cereus Vargasianus Cárdenas, sp. nov.

Succulenta 1951 (3): 34; fig. p. 34; pl. p. 35; 1951.

CARDENAS, Martin 1951 [July-August]

"Twee nieuwe Cereussorten"

(continued)

Succulenta 1951 (4): 49-52, 1951.

Cereus huilunchu Cárdenas, sp. nov.

Succulenta 1951 (4): 49; fig. p. 50; pl. p. 49, 51; 1951.

CARDENAS, Martin 1951 [May-June]

"New Bolivian Cacti, II"

Cact. & Succ. Jour. Amer. 23 (3): 89-98, 1951.

Castellanosia Cárdenas, gen. nov.

Cact. & Succ. Jour. Amer. 23 (3): 90, 1951.

Castellanosia caineana Cárdenas, sp. nov.

Cact. & Succ. Jour. Amer. 23 (3): 90, fig. 37-39, 1951.

Bolivicereus Cárdenas, gen. nov.

Cact. & Succ. Jour. Amer. 23 (3): 91, 1951.

Bolivicereus samaipatanus Cárdenas, sp. nov.

Cact. & Succ. Jour. Amer. 23 (3): 91, fig. 40-43, 1951.

Bolivicereus samaipatanus Cárdenas var.

multiflorus Cárdenas, var. nov.

Cact. & Succ. Jour. Amer. 23 (3): 93, fig. 44, 1951.

Rebutia arenacea Cárdenas, sp. nov.

Cact. & Succ. Jour. Amer. 23 (3): 94, fig. 45, 46, 1951.

Rebutia glomeriseta Cárdenas, sp. nov.

Cact. & Succ. Jour. Amer. 23 (3): 95, fig. 47, 48, 1951.

Parodia columnaris Cárdenas, sp. nov.

Cact. & Succ. Jour. Amer. 23 (3): 95, fig. 49, 50, 1951.

Parodia tuberculata Cárdenas, sp. nov.

Cact. & Succ. Jour. Amer. 23 (3): 97, fig. 51, 52, 1951.

Parodia ayopayana Cárdenas, sp. nov.

Cact. & Succ. Jour. Amer. 23 (3): 98, fig. 53, 54, 1951.

*Address communications to P. C. Hutchison, Dept. Botany, Univ. of California, Berkeley 4, California.

INTERNATIONAL ORGANIZATION FOR SUCCULENT PLANT STUDY

The British Section of The International Organization for Succulent Plant Study. Secretary and Treasurer: Mr. John D. Donald, 3 Braeside Avenue, Brighton 6, Sussex, England.

Following are some of the high-lights from the early reports:

"If a British Section were formed those working within its orbit would be free to pursue whatever line of study or research they most favoured, they could be put in touch with nationals of other Countries interested in the same subjects and with sources of literature and study material, plants, seeds, or herbarium material, possibly previously unknown to them. Mr. Roan undertook to attach to the report of this meeting a resume of the scope of the I.O.S. and the British Section.

"It is clearly understood that there is no question of direction from any source as regard to method, systematics, nomenclature, or the like and that the normal rules of botanical procedure would apply to the publication and acceptance or non-acceptance of particular findings.

"A general discussion ensued during which it was made clear that the creation of a British Section of the I.O.S. would not mean the formation of a new Society. The intention was to bring about a Fellowship of people interested in the serious and scientific side of succulent plant study and to draw, as far as possible, on the reservoir of workers and facilities known to, or provided by, the two large Societies already in existence. It was hoped that these two Societies would be generous in their support of any work to be attempted.

"It was agreed that only a handful of people could be expected to take part in any serious work but that as many as possible should be invited to provide assistance by way of finance to cover the expenses, however small, which would naturally be incurred. Receipt of such help could not be expressed by granting membership, as participation in any work would, of necessity, be by invitation from the early Fellows. Income would be confined, firstly, to subscriptions to the 'Repertorium Plantarum Succulentarum' and, secondly, to Donations.

"Time and again it was emphasized that any British Section formed was not to be regarded as a Society or in any other way as a competitor to the existing Societies which catered in a greater or lesser degree to the 'popular' side of succulent plant interests.

"It was agreed that, for a start, the 'Repertorium Plantarum Succulentarum' of which the first number (1950) was published in the name of one of these Societies shall, in future, be produced by the British Section of the I.O.S. and that Mr. H. M. Roan shall, for the time being, continue as its Hon. Editor. This 'Repertorium' to be produced annually (1.50 per year in U.S.A.) and, in future, to include omissions from the previous year's issue and the bulk of the appropriate new year's matter.

"It was agreed that an early task should be the development of a key to be circularised as widely as possible with a view to encouraging a standard form of succulent plant description and above all the provision of adequate information."

SUMMARY

The main tasks for which the I.O.S. envisages International Co-operation include:

the establishment of panels of workers for each genus or group of succulent plants,

the assembly and compilation into lists of all names and synonyms, with authors and citation of source, applicable to succulent plants,

the securing of all new type and herbarium material so as to be safeguarded for posterity,

the assembly of seed materials and live plants and the detailed (and mass) study of these by botanists and amateurs alike,

the greatest possible direct exchange and general broadcasting of the latest discoveries so that each worker can be of assistance to each other worker whatever the particular specialized field of interest,

the reduction to the greatest possible extent of publication of new descriptions in little accessible periodicals (and the converse of this),

the organization of groups of workers for the purpose of mass observation of details under the guidance of, or at the request of, botanical and other leading workers,

and similar tasks.

The work of the British Section might be divided into sections or activity parties for work in regard to

1. Literature—synonymy, etc.
2. Specific observations on plant material or seeds (either by named individuals or through mass observations by groups of named amateurs known to members of our circle).
3. Photography and micrography of findings and features relating to plant and seed observations either on their own as reference material or to complement written work.
4. Systematics and taxonomy.
5. Morphology and phylogenetics.
6. Cytology.
7. Bio-chemistry.
8. General reportage upon points 1 to 7 and contact work with parallel individuals and groups elsewhere.

Repertorium Plantarum Succulentarum 1950 is keyed as follows:

- * = Fam. Mesembryanthemaceae
- † = Fam. Cactaceae
- ‡ = Fam. Euphorbiaceae
- § = Fam. Lilaceae
- ¶ = Fam. Crassulaceae

(Samples of the 81 new species and 62 synonyms as listed for 1950.)

- * *Aethephyllum* (N.E.Br.) Schwant., subgen. nov., (typ. *Mesembryanthemum pinnatifidum* L.f.; gen. *Micropterum* Schwant.); Kakt. u.a. Sukk., No. 3, April 1950, p. 7.
- † *Cryptocereus* Alexander, gen. nov., (typ. *Cryptocereus anthonyanus* Alexander); Am. Cact. Jnl., Vol. XII, Nov./Dec., 1950, pp. 164-165.
- † *Cryptocereus anthonyanus* Alexander, spec. nov., Am. Cact. Jnl., Vol. XXII, Nov./Dec. 1950, pp. 163-166.
- † *Cutakia* Backbg., subgen. nov., (typ. *Arthrocerus mello-barretoii* Backbg. et. Voll. 1949; gen. *Arthrocerus* Berger); Am. Cact. Jnl., Vol. No. 5, Sept./Oct. 1950, p. 153.

Observations in an Arizona Garden

By WM. MASTRANGEL

Of Rocking Horse Cactus Gardens

I have just returned from a trip deep into Sonora, Mexico, where I have been hunting El Tigre (Jaguar) with the bow and arrow in company with two fellow bowhunters, nine good tiger dogs and a guide. While there, I had plenty of time to observe many species of Mexican cacti in their native habitat. It had rained before we arrived at our camping grounds—thirty miles north of Guaymas and during my sojourn there, I could almost see the thirsty cacti drinking up this God-given supply of water. *Lophocereus schottii* was throwing out new shoots; the smaller *Mammillarias* observed in this vicinity, were showing new growth. Mind you, that this was transpiring in the latter part of January and the climate at this time was comfortably warm during the days while at night the temperature went down to about 40 degrees. I came across some wonderful specimens of *Lemaireocereus thurberi*—one in particular was over eighteen feet high and the cluster was about 12 ft. in diameter; it was in almost perfect condition. One of the most interesting forms of *Lophocereus* that I observed—at least I think it was *Lophocereus*—was a plant which looked like *L. schottii* but was about twelve feet tall. In form, it looked like *L. thurberi*—the stems being about six to eight inches in diameter however, but it did not have any spines arising from the areoles such as appear on *L. schottii*. Indeed, it was a giant spineless organ pipe, and was the only specimen I saw in the many miles that I traveled on horseback through that country. Actually, I think it is some sort of a giant variety of *L. schottii*. Having my 8mm movie camera, plus color film with me, I took many pictures of this interesting terrain together with many of its plants.

I guess that I have diverted quite a bit from observations in an Arizona garden but I did wish to make mention of this very interesting cactus country in our nearby neighboring state of Sonora, Mexico. The January rains here in Arizona, plus the fact that warm weather has prevailed with us ever since the first of the year, has produced growth on many of our previously dormant cacti. Many of the *Trichocerei* and *Opuntias* are filling out and starting to grow; others showing signs of spring growth are *Echinocerei*, *Peniocereus*, and many others. It seems that the columnar cacti are the first ones to start growth in the spring and I believe this is because columnar cacti grow at a faster rate than the globular—for example, a three

year old *Myrtillocactus geometrizans* will put on as much as 1½ inches to 2 inches growth in a year whereas a three year old *Mammillaria* will gain a half inch at the most.

Have about fifty or sixty *Mammillaria elegans* in our beds, most of which are in full bloom with their brilliant deep red ruby-like flowers—a wonderful thing to see. The date? I am writing this the first week in February, we do have an early spring here in Arizona. *Aloe variegata*, our favorite succulent, has just begun its annual February blooming period with those beautiful orange-red bell-like flowers prettying up our garden. Mrs. Hummel wrote a wonderful article about this fine plant in the January issue of our cactus JOURNAL. About this time, we are now getting ready to water our cacti in regular periods and also our spring insect spraying time is here. We do this once in February and generally once in the middle of summer to keep the plants free from pests. Finely sifted oak leafmold is sprinkled on all beds every year



FIG. 46. *Mammillaria elegans*.

at this time, to give the plants that little bit of extra food which may be needed for the coming flower periods, for in March and April our garden becomes littered with thousands of cactus blooms. The fishhooks, Mammillarias, Astrophytums, Easter Lilies, Rebutias and many others come into bloom here in our Arizona gardens during March and April. Weeds are pulled at this time—the moment they appear, for we believe that weeds and grass take a lot of food and water away from cacti which need it far more than they do.

It is seed planting time now, and we are busy filling new seed boxes—sowing various cacti seeds and covering frames with whitewashed glass. These seed frames get watered every other day or so, until the little seedlings can be transplanted. We are kind of worried that we may have a very hot summer this year in Arizona, since our warm spring days have started so early—in fact, a month too early. Hot summers here are very severe on our cacti as the plants burn up quite a bit and the dry hot air sucks all the moisture out of the ground before the plant has any chance to absorb it. Watering then becomes a problem to us. But then, no cactus garden can have ideal conditions—the southwest is too hot, the north and east is too cold and have very few sunny days, some parts of California have too much smog, while other places in our fair country are too damp.

THE BREATH OF LIFE

By LOUIS E. BLANCHARD

In answer to the JOURNAL's query concerning the similarities of *chlorophyll* and the blood pigments of man and mollusks, I will attempt to explain briefly their distinctive qualities.

Chlorophyll is a green complex organic pigment in the chloroplasts of plant cells. It is composed of two similar proteins, known as chlorophyll a and chlorophyll b. This complex molecule contains many atoms of carbon, hydrogen, oxygen and nitrogen, built around a hub of *magnesium*. Although iron is essential for its production, it does not enter into its composition.

The red *hemoglobin* molecule of human blood is formed by the union of two highly complex proteins known as globin and hematin. The formula for this pigment is similar to that for chlorophyll, but with *iron* (Fe) substituted for *magnesium* (Mg).

In the invertebrates, such as oysters and lobsters, the blood pigment, *hemocyanin*, is blue. This is due to the *copper* (Cu) which replaces the *iron* (Fe) of hemoglobin.

These compounds (chlorophyll, hemoglobin and hemocyanin) are chromoproteins and represent combinations of proteins with specific pig-

ments. For example, hemoglobin is an iron complex joined to the protein molecule.

The blood pigments (hemoglobin and hemocyanin) have respiratory functions and are characterized by their ability to combine easily with loosely-held oxygen. By means of these pigments, the capacity of the blood to carry oxygen is multiplied about seventy times.

Chlorophyll has an entirely different function, even though it structurally resembles the respiratory pigments. It is wholly confined to green plants where it is active only in the living condition. It is unique in its *synthetic ability* to combine carbon dioxide from the air and water from the soil to produce carbohydrates (sugars) and liberate oxygen. This process of *photosynthesis* takes place through the ability of chlorophyll—containing cells to utilize the radiant energy of sunlight. This is a reaction whereby low-energy inorganic compounds are transformed to highly potent organic products (sugars). It operates most efficiently in leaves, but in arid regions, the green stems of succulent and xerophytic plants perform this task. As chlorophyll functions without being consumed, it is regarded as an organic catalyst or enzyme.

Carbohydrates are utilized by the plant to obtain energy through respiration (oxidation) and to synthesize other substances, such as proteins and fats by its combination with absorbed inorganic salts. These products are rendered soluble by digestion and in such conditions are available for incorporation into living protoplasm. The mechanism of *assimilation* whereby inanimate materials cross the bridge of life, to become integrated into living structures, remains Nature's greatest unsolved mystery.

Chlorophyll has a *monopoly* of the manufacture of food. It bestows upon green plants the power of complete independency, and is directly or indirectly essential to all other forms of life. All the foods in animal nutrition, including man, are modifications of the sugar produced by photosynthesis. Food materials such as meat, milk, and eggs are obviously indirectly derived from plants.

Chlorophyll is the connecting link between the animate and the inanimate world; it alone has the power to breathe the breath of life into the dust of the earth.

EPIPHYLLUM HANDBOOK—Scott E. Haselton—\$4.00

The purpose of this book is to help one to know and enjoy his plants to the fullest extent. For the scientific minded there are descriptions of the genera in the Epiphyllanace and the keys of Schumann, Berger, and Britton and Rose. For the beginner, the pictures alone will tell the complete story of these fascinating plants—how to make them grow and flower. *Contains:* 250 pages 5½x8 in., 170 photographs, several color plates. Printed on the best coated paper, bound in Buckram \$4.00.



SPINE CHATS

LADISLAV CUTAK



The bat-filled jungle that covers large areas of the seaward slopes of Venezuela's Maritime Andes is known as the "shrouded forest" because a strange white mist rises from the moisture-soaked earth to envelope everything like a shroud. It has an extremely rich animal life as well as plant life. This jungle is a paradise for naturalists and collectors. Among the most notable of the naturalist-explorers of this region was the Swiss-born Henry Pittier, who spent the last 37 years of his life in Venezuela. He died in 1950. (For a short biographical sketch see *Spine Chats* for Jan.-Feb. 1952). In his honor the Venezuelan government has just set aside a large tract of the shrouded jungle as a wild-life preserve and national park. Under this arrangement it will be preserved perpetually as a part of the primeval jungle for the benefit of naturalists from all over the world who have been invited to carry out researches there. The 210,000-acre HENRY PITIER NATIONAL PARK straddles the coastal range for a distance of 32 miles. It extends down to the sea and includes part of the large fresh-water Lake Valencia. The area consists of a park-like forest on top of the mountains, thick jungle on the slopes, and wasteland on the plains near the sea. It includes areas of sword grass covered savanna, thorn woodland and cactus scrub. Henry Pittier was also a cactician, having collected and described a number of cacti.

* * *

H. Hall of Kirstenboch (National Botanic Garden, South Africa) writes in the *English Gardeners' Chronicle* (Nov. 19, 1953) that all the *Lithops* do not imitate pebbles nor necessarily inhabit deserts, as is popularly believed. *Lithops lesliei* usually occurs in grass veld often in deep rich soil, while the rainfall is perhaps 20 inches or more, falling generally in the form of summer thunderstorms. He has seen *Lithops salicola* growing in untold numbers in "vlei" or "pan," which could be classified as a temporary marsh and this beautiful white-flowered plant is inundated after a rain in such a situation. *Lithops terricolor* is found under small shrubs in stony ground but a long way from any 'desert.' Many species of *Lithops* inhabit mountain tops, some such as *L. pseudotruncatella* found at 6,000 ft. *Lithops olivacea* and *L. marmorata* are also from mountain tops in gravel-strewn pockets and fissures of the solid rock. The *Conophytums* also grow under a variety of conditions, altitude, rainfall and geology. *Conophytum minusculum* carpets the summits of bare hills and usually grows in little else than half-inch or less of Moss and Lichen.

* * *

A cytotoxic study made by Charles H. Uhl and Reid Moran shows that *Dudleya* and *Hasseanthus* are closely related. Therefore in *Leaflets of Western Botany* (vol. 7, No. 4, 1953) *Hasseanthus* is transferred to *Dudleya* and specific changes made to include the new combinations.

* * *

Alfredo Garcia Sanchez, Jorge de Alba & Guillermo L. Narvaez write about the Feeding Value of

Sotol in the Jan.-June, 1953, issue of *Turrialba*. The article describes two experiments carried out in Mexico on the dry-land sotol plant—*Dasylirion*. The first with beef cattle, and the second with dairy cattle, both in the State of Coahuila. The authors conclude that sotol is an emergency forage of limited value because of its high fiber content but that because of its low cost per unit of beef or milk produced, it is of great practical utility where it grows naturally.

* * *

Jamaica has received only sporadic and localized study and therefore a more complete evaluation of the vegetation is long over-due. Thus, with the establishment of the new University College of the West Indies, G. F. Asprey and R. G. Robbins began a study of the flora and the plant communities in that island. Jamaica forms part of the string of Caribbean Islands stretching in an arc from Florida to Venezuela. It is the largest of the British West Indian Islands, with an area of 4,411 sq. miles. The island is dominated by its mountains which reach their maximum height of 7,402 ft. at Blue Mountain Peak. More than half of the country is above 1,000 ft. in elevation. Four hundred years of European occupation have wrought a tremendous change in the vegetation. Jamaica has a total flora of some 4,000 plants, excluding the fungi and lichens. The vegetation of Jamaica, with the exception of the montane regions, is tropical. The major ecological boundaries are determined by a wet northern coast, a central montane region and a dry southern plain. Within these boundaries, however, many local factors operate to bring about a very diverse and varied vegetational pattern. Along the southern coast there is a series of rocky limestone hills and ranges, for the most part under 2,000 ft. elevation. There is a drought period of more than six months. The arid hills are of fissured, honey-comb, white limestone and support a xeric scrub-forest of particular interest to the ecologist. The xerophytic vegetation is tolerant of salt spray and sweeping winds. The littoral woodland is made up of hard-leaved dry limestone shrubs together with cacti, halophytes and salt resistant trees not encountered inland. A feature of the faciation is the presence of cacti of which the *Cereus*, forming columns up to 20 ft. high, is abundant. Such cacti occur only here and in the thorn-scrub of Jamaica. Cacti found are *Cereus peruvianus*, *Opuntia tuna*, *O. jamaicensis*, *O. spinosissima* and *Melocactus communis*.

* * *

According to a report in the *Wall Street Journal*, the Liquinex Company, manufacturer of a patented liquid fertilizer, leased a 5-acre tract near Kingman, Arizona, upon which it was to construct a factory for the extraction of juice of the common desert yucca and blend it with nitrogen, phosphate and potash to make the Liquinex product.

* * *

Mr. P. J. Measures would like to exchange correspondence with anyone interested in *Echinocereus*, *Notocactus*, *Ariocarpus*, *Lobivia*, and *Rebutia*. His address is Keyston House, Hants, England.

FROM MEXICO

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FROM THE PRESIDENT'S DESK

It has now become possible for me to report on some of the proposed activities which the Society will sponsor during 1954 and I am happy to say that it looks like we will have a very active year.

At the meeting of the Executive Board, held January 8th, 1954, the new officers took over their duties and the appointive officers were chosen for the year.

A number of proposals were brought forth by your President and most of them were enthusiastically received by the Board. As a result of these proposals, a committee was chosen, with Dr. Lyman Benson as Chairman, to study the proposals and make arrangements to implement some of these ideas. The committee will make their report at the special meeting of the Executive Board to be held March 5th, 1954.

The proposals given to the committee, when put into effect, will permit all members of the Society, their friends and as many of the interested public as wishes to do so, to take part in the doings of the

Society. These will probably include public meetings, with qualified speakers and colored slides, garden tours to the local Botanical Gardens and to the outstanding private collections, and whenever feasible an overnight or weekend trip to some of the most interesting desert areas in the Southwest.

While it is not humanly possible to provide such a program for the entire membership, due to difficulties of distance, efforts will be made to have some capable person write an accurate account of the talks, the tours and the desert trips for publication in the JOURNAL.

At the January meeting of the Executive Board, each member present promised to prepare for publication at least two articles for the JOURNAL during 1954, these articles to be of especial interest to the beginner, the amateur and the advanced amateur, it being the opinion of all that the really advanced collectors and students did not need assistance as much as those just beginning to study and collect the succulent plants.

As you have no doubt already noticed, the Society is conducting throughout 1954, a membership contest, with mature plants as the prizes, through which we hope, with the help of all the present members of the Society, to materially increase the membership and build a better, closer knit organization. Won't you give us your help?

While the final definite plans are yet a long way off, it has been decided to hold the Sixth Biennial Convention in El Paso, Texas, as decided by the delegates at the last convention, the date probably sometime in July, 1955. Mr. John Hicks Leasure has agreed to serve as Local Chairman and no doubt he will have a fine program worked out before that time. On to Texas in 1955!

Your Research Board is ready and willing to help you in any way they can, so tell them your troubles and let them work for you.

The Corresponding Secretary now has four sets of colored slides available for the use of the Affiliates or other interested groups, write to her as follows: Mary Glade, 7600 Verdugo Cristline Dr., Tujunga, Calif.

If you have problems or questions and do not know who to ask for help please write me, Homer G. Rush, 820 W. 115th St., Los Angeles 44, Calif., stating your troubles and I will either answer them myself or turn them over to someone else qualified to do so.

HOMER RUSH, President.

NEW BOOK ON SUCCULENTS

"Unusual Plants" is the title of J. R. Brown's new book. There are 110 of his finest photographs of succulents printed on the best paper available. The 8 x 11 inch page size shows the excellence of the photographs to the best advantage. The list price of \$7.50 will be reduced to \$5.50 to Society Members who order in advance of publication. The book is now on the press (see one of the plates on page 41 of this JOURNAL). Those who have ordered a book at the list price will receive a refund when the book is shipped. Not sold through dealers. Mail your order now (add sales tax in California) to ABBEY GARDEN PRESS, 132 West Union Street, Pasadena 1, California.

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